PROJECT MANUAL FOR:

MANCHESTER COMMUNITY COLLEGE
TEMPORARY KITCHEN CLASSROOM
RENOVATION
1066 Front Street
Manchester, New Hampshire

WARREN STREET ARCHITECTS, INC.
27 WARREN STREET
CONCORD, NH 03301
(603) 225-0640    FAX (603) 225-0621

TF MORAN, INC.
48 CONSTITUTION DRIVE
BEDFORD, NH 03110
(603) 472-4488

YEATON ASSOCIATES, INC
66 JACKSON AVENUE
LITTLETON, NH 03561
(603) 446-6578

WAI PROJECT NO.: 3043
DATE: April 17, 2013
INVITATION TO BID – CCSNH

Sealed proposals will be accepted at the MANCHESTER COMMUNITY COLLEGE, 1066 Front Street, Manchester, NH 03102, Attention Sarah Diversi, Chief Financial Officer until 3:00 PM, prevailing time, on Friday, May 17th, 2013 for the following project:

MANCHESTER COMMUNITY COLLEGE
TEMPORARY KITCHEN CLASSROOM RENOVATION
MANCHESTER, NEW HAMPSHIRE 03102
Project # MCC13-17

Description: This project consists of construction of Interior renovation of the previously converted automotive bay to a temporary kitchen into classrooms, located at the North West corner of the existing Manchester Community College Facility. Project includes:

1. Interior Renovation of an approximate 4,800 SF warehouse space, most recently used as a temporary kitchen and cafeteria into classrooms.
2. Associated exterior façade improvements and window replacement.

The Project will include but not be limited to the Disciplines of: Site Construction, Concrete, Structural and Fabricated Metals, Insulated Metal Wall Panels, Roofing and Flashing, Finishes, Sprinkler, Plumbing, HVAC and Electrical Systems, etc. Estimated cost of work to be approximately $350,000-$500,000.00.

Plans and specifications will be available from the Community College System of New Hampshire at: www.ccsnh.edu/open-bids.

BIDDERS SHOULD ACT PROMPTLY AND SUBMIT ALL QUESTIONS IN WRITING TO Kate Morrone FAX 603/219-0141, E-MAIL kmorrone@ccsnh.edu IN ACCORDANCE WITH “EXPLANATION TO BIDDERS” – INSTRUCTIONS TO BIDDERS, SECTION 002113.

A MANDATORY SITE WALK WILL BE HELD WEDNESDAY MAY 8, 2013 AT 3:00PM. MEET AT THE MAIN ENTRANCE TO THE COLLEGE BUILDING.

The Project anticipated to be substantial complete by AUGUST 23, 2013, suitable for classroom use.
Proposals must be completed in both words and figures on forms furnished by the College, or on previously-approved, substantially-identical forms generated by computer software, which shall be submitted in a sealed envelope marked: Proposal for: “Manchester Community College –Temporary Kitchen Classroom Renovation MCC13-17,” received by the College as specified no later than the date and time mentioned above.

Bidders must show three recent years’ experience with installations of a similar complexity and cost and prior experience with installations of the materials within 50 miles of the project site.

The successful bidder will be required to comply with State of New Hampshire RSA#21-1:81-a. The successful bidder will be required to furnish a 100% payment and 100% performance bond prior to execution of contract.

The award will be based on the proposal that best meets the needs of the college. Factors included will be the cost, completeness of the proposal, quality of the technology provided, and experience of the contractor and installation team. The college reserves the right to waive any informalities in or to reject any or all proposals.

<table>
<thead>
<tr>
<th>Category</th>
<th>Possible Points*</th>
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<tbody>
<tr>
<td>1. Cost of Base Proposal</td>
<td>40</td>
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<td>2. Quality of the related projects/areas of expertise/experience</td>
<td>30</td>
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<tr>
<td>3. Quality of description of the firm’s construction approach</td>
<td>10</td>
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<tr>
<td>4. Response time to Construction and Warrantee issues</td>
<td>20</td>
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</tbody>
</table>

Grand Total 100*

*Maximum points for the best and so forth. Difference between scores is based on how close they are to one another.

The college reserves the right to waive any and all informalities in its best interest.

All contract documents can be found on the CCSNH website at www.ccsnh.edu/open-bids. Before your submission, always check for any addenda or other materials that may have been issued which would affect the invitation to bid by checking the CCSNH website at www.ccsnh.edu/open-bids.

Matt Moore, PE,
Director of Capital Projects
Community College System of New Hampshire

END OF DOCUMENT
Manchester Community College - Project #MCC 13-17

Qualifications to perform the work: List Three
Experience with full responsibility for work of a similar size and within 50 miles of the project site. Bidders are to provide evidence of qualifications with the bid.

<table>
<thead>
<tr>
<th>NAME OF REFERENCE PROJECT</th>
<th>Location of Project</th>
<th>Date work performed</th>
<th>Name of Owner</th>
<th>Description of Project</th>
<th>Approx Contract value</th>
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END OF DOCUMENT
COMMUNITY COLLEGE SYSTEM OF NEW HAMPSHIRE
INSURANCE REQUIRED OF CONTRACTORS

TYPES OF INSURANCE REQUIRED
For the purposes of this document the term Contractor shall include each and every contractor, subcontractor, and sub-subcontractor utilized by the General Contractor to complete the construction project.

General Liability Insurance
Commercial General Liability insurance covers claims for Bodily Injury and Property damage. CCSNH requires GL insurance when:

♦ A contractor will be working at a CCSNH location.
♦ The contractor has third parties on CCSNH’s premises who could be injured or cause injury to others.
♦ Their “completed work” (building; renovations; HVAC; etc.) may fail, causing bodily injury or property damage
♦ The contractor is likely to subcontract part of their work

Automobile Liability Insurance
A Business Auto Liability insurance is required when a Contractor and/or their employees and subcontractors will operate, maintain, load or unload vehicles as part of their contracted work on any campus. As such, any Contractor who drives onto CCSNH’s owned or leased property should be required to provide evidence of a Commercial Automobile Liability insurance.

Umbrella/Excess Liability Insurance
An Umbrella/Excess policy is required when CCSNH is requesting total per occurrence and aggregate limits of liability that are higher than those carried by the Contractor in their “primary” General Liability, Auto Liability or Employer’s Liability (WC) policies – which is always the case. Note: General Liability policies typically provide limits of $1,000,000 per occurrence and $2,000,000 aggregate. Automobile liability policies generally provide a $1,000,000 “combined single” (CSL) limit.

Workers’ Compensation Insurance
CCSNH should request evidence of Workers’ Compensation (including Employers Liability coverage) for EACH AND EVERY Contractor. Evidence of workers’ compensation insurance from subcontractors and sub-subcontractors is the responsibility of General Contractor.

Property Insurance
When a new building is being constructed or an existing building is being renovated, coverage for the building material and the structure itself is provided by CCSNH.
However, the Contractor, all Subcontractors, and Sub-subcontractors should be aware that this “Builder’s Risk” coverage does not provide coverage for the Contractor’s business personal property – tools, equipment, etc. As such, they need to provide coverage for this exposure themselves.

**Pollution Liability Insurance**
Pollution legal liability insurance may be required if there is a chance that the Contractor may cause a first party or third party liability or property damage claim arising out of the “pollution” of any land, water or buildings by any type of “hazardous waste” material through their own actions or actions of another acting on their behalf.

**Professional/Errors & Omissions Liability Insurance**
Professional or E&O insurance is required of all Architects and Engineers who provide the design and engineering for buildings and other structures.

**LIMITS OF INSURANCE REQUIRED**
The following insurance requirements are to be used as a guide for CCSNH’s contracts with Contractors/Sub-Contractors. The insurance requirements and indemnification language that are ultimately incorporated into the contracts should be tailored to the operations and exposures with respect to the construction being performed in order to protect the interests of CCSNH and its Affiliated Entities.

**Commercial General Liability:** Contractor agrees to maintain in full force during the term of this contract and until the completion of this project Commercial General Liability insurance with the following minimum limits of liability:

- $1,000,000 per occurrence Limit for bodily injury/property damage
- $1,000,000 per occurrence Personal and advertising injury
- $2,000,000 aggregate Products/completed operations
- $2,000,000 aggregate Policy aggregate
- $5,000 per person Medical expense

These limits shall be provided per project/per job.

**Automobile Liability Insurance:** Contractor agrees to maintain in full force during the term of this contract and until the completion of this project Commercial Automobile Liability insurance for all owned, non-owned, and hired vehicles/trucks. The minimum limit of liability shall be $1,000,000 each accident, combined single limit for Bodily Injury and Property Damage.

**Workers’ Compensation Insurance:** Contractor agrees to maintain in full force and effect Workers’ Compensation insurance which provides statutory coverage for Workers’ Compensation claims and Employers’ Liability insurance subject to minimum limits of:

- $500,000 each accident Bodily injury by accident
$500,000 each employee  Bodily injury by disease
$500,000 policy limit  Bodily injury by disease

or the minimum limits required by Contractor’s Umbrella insurer.

**Umbrella Liability Insurance:** Contractor agrees to maintain in full force and affect Umbrella Liability insurance which provides excess following form coverage over the underlying Commercial General Liability, Automobile Liability, and Employers Liability policies previously described. The Umbrella/Excess policy will provide minimum limits of liability of $5,000,000 per occurrence and aggregate - and the aggregate limit should be provided on a “per project or job” or location basis.

**Professional Liability Insurance:** Architect/Engineer agrees to maintain in full force during the term of this contract and for a period of five years after the completion of this project, Architects and Engineers Professional Liability (Errors and Omissions) insurance subject to a minimum per occurrence and aggregate limit of $3,000,000. Note: The scope of coverage and limit provided by the policy shall encompass the Architect/Engineers obligations as defined in the project agreement.

**Personal Property Insurance:** Contractor is responsible for the purchase and maintenance of “property” insurance on a “replacement cost basis” to cover all of “property” (tools, equipment, materials, etc.) owned by the Contractor. Note: The contract should indicate that the property will “be the sole responsibility and risk of Contractor” and that “CCSNH shall not be liable for any loss, damage, or theft to such property.”

**Other Insurance:** CCSNH reserves the right to require the Contractor to maintain additional insurance coverage as deemed necessary by the nature of the contract and from time to time during the contract period.

**OTHER INSURANCE ISSUES AND REQUIREMENTS:**

**General Requirements**

Contractor is required to maintain, during the life of this contract with CCSNH, insurance that will adequately protect CCSNH and the Contractor against the exposures inherent to the contract and construction project. The insurance policies provided by Contractor must be underwritten by an insurance company that is financially sound and adequately rated (“A-” or higher) by one or more of the leading financial rating services including AM Best, Moody’s and/or Standard & Poors. The insurance companies utilized by the Contractor must be licensed to do business in the State of New Hampshire. If such insurance is provided by “self-insurance” or a Captive insurance company, adequate financial data should be provided to assure CCSNH of the Contractor’s ability to fund all deductibles, retentions and claims that occur.
**Additional Insureds:** The required Commercial General Liability Automobile Liability and Excess/Umbrella Liability coverage shall name CCSNH, its affiliates, subsidiaries, trustees, officers, employees and agents as additional insureds.

**Certificates of Insurance (COI)**
CCSNH requires the Contractor furnish Certificates of Insurance (COI) for the required coverage and limits to CCSNH before commencing work and 30 days prior to each renewal date of the required insurance policies. Such certificates shall state that, in the event of cancellation, material change in coverage or non-renewal, the Contractor will notify CCSNH at least thirty (30) days in advance via formal, written documentation.

**Cancellation/Non-Renewal**
In the event that any of the insurance policies purchased by the Contractor to satisfy the requirements in the contract are cancelled by the insurer, non-renewed by the Contractor or are changed materially (coverage, limits, etc.), CCSNH must be notified at least 60 days in advance of such an event. If the Contractor does not provide such notice, CCSNH has the right to procure the specified insurance coverage and charge the premiums back to the Contractor.

**Occurrence/Claims Made Forms**
CCSNH prefers that all Liability policies purchased by the Contractor to satisfy the requirements in the contract are written on an "occurrence" basis. However, if any liability policy must be written on a "claims made" basis, the Contractor must maintain such insurance for a minimum of three years after the termination of the contract or provide “tail coverage” if the policy is cancelled or non-renewed with a retroactive date that precedes the inception of the contract - or “prior acts” coverage without any time limitation.
MANCHESTER COMMUNITY COLLEGE

TEMPORARY KITCHEN
CLASSROOM RENOVATION
MCC 13-17

MANCHESTER, NEW HAMPSHIRE

1066 FRONT STREET, 03102
APRIL 17, 2013

THE COLLEGE SYSTEM RESERVES THE RIGHT TO AWARD ANY OR ALL ITEMS.
PROPOSAL FORM

Proposal of: ________________________________

Address: ________________________________

To furnish all materials and to do and perform work in accordance with the plans and specifications, on which proposals shall be submitted in a sealed envelope marked: Proposal for: “Manchester Community College Temporary Kitchen Classroom Renovation” and delivered to the Manchester Community College – Office of the Chief Financial Officer, 1066 Front St, Manchester, NH 03102 3:00 P.M., Prevailing Time, on Friday May 17, 2013 for the following project:

MANCHESTER COMMUNITY COLLEGE
TEMPORARY KITCHEN CLASSROOM RENOVATION
1066 FRONT STREET
MANCHESTER, NH 03102

Delivery of Proposal: Proposal shall be placed in sealed envelope plainly marked to indicate its contents and addressed to the College at the address shown on the Invitation to Bids. Sealed Proposals shall be received and deposited in the Bid Box at the location specified prior to the time and deposited as specified. Proposals delivered to the College by alternate means are submitted at the sole risk of the Bidder. The College will not accept responsibility for any reason if the Proposal is not deposited in the Bid Box by the specified time and date. Proposals received after the time for opening of bids will be returned to the bidder unopened.

Ms. Susan Huard, President
Manchester Community College
1066 Front St
Manchester, New Hampshire, 03102

Dear President:

In accordance with the advertisement of the College inviting proposals for the project herein before named, and in conformity with the plans and specifications on file in the offices of the College, I/WE hereby certify that I AM/WE ARE the only person or persons, interested in this proposal as principals; that this proposal is made without collusion with any person, firm or corporation, that an examination has been made of the plans and specifications and of the site of the work, and proposed to furnish all necessary machinery, equipment, tools and labor, and to furnish all materials specified in the manner and at the time prescribed at the following prices:
ITEMS AND UNITS TABLE

Rules of Prices Note: This Proposal shall be filled in by the Bidder, with the Prices written in both words and numerals, and the extensions will be made by him in the spaces provided.
All bidders are to include ALL items. Grand total is too include all the scope for all the projects.

<table>
<thead>
<tr>
<th>ITEM NO.</th>
<th>APPROXIMATE QUANTITIES AND UNIT TYPE</th>
<th>ITEMS AND UNITS PRICES BID</th>
<th>COST PER UNIT (DOLLARS CENTS)</th>
<th>ITEM SUBTOTAL (DOLLARS CENTS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 EACH</td>
<td>ITEM #1- ALL WIRK DESCRIBED IN WARRENSTREET’S CONTRACT DOCUMENTS TO PROVIDE RENOVATIONS TO THE MANCHESTER COMMUNITY COLLEGE EXISTING TEMPORARY KITCHEN INTO CLASSROOM SPACE.</td>
<td>1 PER EACH</td>
<td>$.</td>
</tr>
<tr>
<td>2</td>
<td>1 EACH</td>
<td>ITEM #2 - ALLOWANCE FOR UNFORESEEN CONDITIONS</td>
<td>1 PER EACH</td>
<td>$10,000.00</td>
</tr>
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<td>3</td>
<td>1 EACH</td>
<td>ITEM #3: ALTERNATE #1 REMOVE UNDERGROUND TANK AND VENTING</td>
<td>1 PER EACH</td>
<td>$.</td>
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<tr>
<td>4</td>
<td>1 EACH</td>
<td>ITEM #4: ALTERNATE #2 DEMO FASCIA AND BUILD PARAPET WALL ON PROJECT GABLE.</td>
<td>1 PER EACH</td>
<td>$.</td>
</tr>
<tr>
<td>5</td>
<td>1 EACH</td>
<td>ITEM #5: ALTERNATE #3 DEMO FASCIA AND BUILD PARAPET WALL ON ADJACENT DAYCARE GABLE.</td>
<td>1 PER EACH</td>
<td>$.</td>
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</table>

THE LUMP SUM GRAND TOTAL FOR THIS PROJECT IS: (SUM OF ITEM SUBTOTALS OF
ITEMS #1 and #2. In numbers: [ ].

LUMP SUM GRAND TOTAL IN WORDS:

______________________________________________________________________________________

LUMP SUM GRAND TOTAL MUST ALSO BE ENTERED ON THE COVER PAGE OF THE PROPOSAL.

The Chancellor reserves the right to waive any and all informalities in the best interests of the College. It is further proposed:

To execute the form of contract and to complete the project on or before AUGUST 23, 2013 and in accordance with agreed to extensions based on weather conditions.

To furnish a contract bond in the amount of one hundred percent (100%) of the contract award as security for the completion of the contract in accordance with the plans and specifications and contract documents. The form of bond shall be that provided for by the Department, and the surety shall be acceptable to the Chancellor.

To guarantee all of the work performed under this contract to be done in accordance with the plans and specifications and the contract documents.

The undersigned acknowledges receipt of the following addenda, issued during the bidding time, and states that these have been incorporated in this proposal:

Addendum No. dated _____________________________
IF A PARTNERSHIP

Signature of Bidder: ____________________________________________

(printed name and title)

Partnership Name & Address

________________________________________________________________________

________________________________________________________________________

Names and Addresses of Members of the Partnership:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
IF AN LLC

Signature of Bidder: ______________________________________________________

(printed name and title)

LLC Name & Address:

________________________________________________________

________________________________________________________

________________________________________________________

Names and Addresses of Members and Managers:

________________________________________________________

________________________________________________________

________________________________________________________

________________________________________________________

________________________________________________________
IF A CORPORATION

Signature of Bidder: __________________________________________

Corporation Name & Address: __________________________________

___________________________________________________________

Incorporated under the laws of the State of _______________________

Bidder shall provide a Certificate of Good Standing or Registration from the NH Secretary of State’s Office indicating that the Bidder is authorized to conduct business in New Hampshire.

Names and Addresses of Corporate Officers: [A bid by a person who affixes to his/her signature, the word "President," "Secretary," "Agent" or other designation, without disclosing whom he/she is representing if other than the contracting entity noted above, may be held to the bid of the individual signing.]

President

Name: _______________________________________________________

Address: ____________________________________________________

Secretary

Name: _______________________________________________________

Address: ____________________________________________________

(Enter Designation of another Corporate Officer below, such as Vice President or Agent ....)

Name: _______________________________________________________

Address: ____________________________________________________
IF A PROPRIETORSHIP

Signature of Bidder: ____________________________________________________________

(printed name and title)

Proprietorship Name & Address:

____________________________________________________________________________

____________________________________________________________________________

If Applicable, a D/B/A or Trade Name:

____________________________________________________________________________

If Applicable, Certificate from Secretary of State’s Office to be attached.

END OF DOCUMENT
AGREEMENT made as of the day of ___ in the year ___ (In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)
Manchester Community College
1066 Front Street
Manchester, NH 03102

and the Contractor:
(Name, legal status, address and other information)

for the following Project:
(Name, location and detailed description)
MCC13-17 Temp Kitchen to Classrooms

The Architect:
(Name, legal status, address and other information)
Jonathan Halle, AIA, ASLA
Warrenstreet Architects, Inc
27 Warren Street
Concord, NH 03301-4049

The Owner and Contractor agree as follows.

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.

AIA Document A201™—2007,
General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.
TABLE OF ARTICLES
1 THE CONTRACT DOCUMENTS
2 THE WORK OF THIS CONTRACT
3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
4 CONTRACT SUM
5 PAYMENTS
6 DISPUTE RESOLUTION
7 TERMINATION OR SUSPENSION
8 MISCELLANEOUS PROVISIONS
9 ENUMERATION OF CONTRACT DOCUMENTS
10 INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS
The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9. A list of Contract Documents is set forth in Exhibit A hereto.

ARTICLE 2 THE WORK OF THIS CONTRACT
The Contractor shall fully execute the Work described in the Contract Documents. The term "Work" means 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.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.
(Inset the date of commencement if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

If, prior to the commencement of the Work, the Owner requires time to file mortgages and other security interests, the Owner's time requirement shall be as follows:

§ 3.2 The Contract Time shall be measured from the date of commencement.

§ 3.3 The Contractor shall perform in accordance with the Schedule attached hereto as Exhibit B and shall achieve Substantial Completion of the entire Work not later than August 23rd, 2013.)
Substantial Completion Data
August 23rd, 2013

(subject to adjustments of this Contract Time as provided in the Contract Documents.
(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

3.4 Liquidated Damages: If the Contractor fails to achieve Substantial Completion on the Substantial Completion Date, as that date may be modified in accordance with the Contract, the Contractor shall pay to the Owner, or the Owner may withhold amounts otherwise due, liquidated damages in the amount of three hundred sixty seven dollars ($367,00) per day for each day after the Substantial Completion Date the Contractor fails to achieve Substantial Completion of the work. The Contractor acknowledges that the liquidated damages provided by this paragraph are reasonable and not a penalty. The Contractor shall achieve Final Completion within thirty (30) days after Substantial Completion. In the event that the Contractor, without excuse, fails to achieve Final Completion with in the thirty (30) days after Substantial Completion, the Contractor shall be liable to the Owner for actual damages, if any, incurred by the Owner.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be ($ ), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:
(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

§ 4.3 Unit prices, if any:
(Identify and state the unit price; state quantity limitations, if any, to which the unit price will be applicable.)

<table>
<thead>
<tr>
<th>Item</th>
<th>Units and Limitations</th>
<th>Price Per Unit ($0.00)</th>
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</thead>
</table>

§ 4.4 Allowances included in the Contract Sum, if any:
(Identify allowance and state exclusions, if any, from the allowance price.)

<table>
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<tr>
<th>Item</th>
<th>Price</th>
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§ 4.5 The Contract Sum is based upon the Schedule of Values set forth as Exhibit C and the Qualification and Assumptions set forth as Exhibit D.

ARTICLE 5 PAYMENTS

§ 5.1 PROGRESS PAYMENTS
§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month. The Contractor shall, not less than ten (10) business days prior to the end of each month, submit to the Owner and the Architect, a Pencil Application for Payment which projects work to be completed and paid for through the end of the month for review by Owner and the parties shall meet by the end of the month to review jointly. By the last day of the month, the Contractor shall submit an Application for Payment.
§ 5.1.3 Provided that an Application for Payment is received by the Owner not later than the last day of a month, the Owner shall make payment of the certified amount to the Contractor not later than the last day of the next month. If an Application for Payment is received by the Owner after the application date fixed above, payment shall be made by the Owner not later than 30 ( ) days after the Owner receives the Application for Payment.

(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the Owner may require. This schedule, unless objected to by the Owner, shall be used as a basis for reviewing the Contractor’s Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

1. Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of five percent (5%). Pending final determination of cost of the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™-2007, General Conditions of the Contract for Construction;

2. Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, 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), less retainage of five percent (5%);

3. Subtract the aggregate of previous payments made by the Owner, and

4. Subtract amounts, if any, for which the Owner has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201-2007.

§ 5.1.7 The progress payment amount determined in accordance with Section 5.1.6 shall be further modified under the following circumstances:

1. Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Owner shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and

(Section 9.8.5 of AIA Document A201-2007 requires release of applicable retainage upon Substantial Completion of Work with consent of surety, if any.)

2. Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of AIA Document A201-2007.

§ 5.1.8 Reduction or limitation of retainage, if any, shall be as follows:

(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.6.1 and 5.1.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)
§ 5.2.9 Except with the Owner’s prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 FINAL PAYMENT
§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when
   .1 the Contractor has fully performed the Contract except for the Contractor’s responsibility to correct Work as provided in Section 12.2.2 of AIA Document A201–2007, and to satisfy other requirements, if any, which extend beyond final payment, and
   .2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner’s final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect’s final Certificate for Payment, or as follows:

ARTICLE 6 DISPUTE RESOLUTION
§ 6.1 INITIAL DECISION MAKER
The Owner will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.
   (If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Owner.)

§ 6.2 BINDING DISPUTE RESOLUTION
For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A201–2007, the method of binding dispute resolution shall be as follows:
   (Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.)

   [ ] Arbitration pursuant to Section 15.4 of AIA Document A201–2007
   [X] Litigation in a court of competent jurisdiction
   [ ] Other (Specify)

ARTICLE 7 TERMINATION OR SUSPENSION
§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007.

ARTICLE 8 MISCELLANEOUS PROVISIONS
§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located. (Insert rate of interest agreed upon, if any.)
§ 8.3 The Owner’s representative:
(Name, address and other information)

§ 8.4 The Contractor’s representative:
(Name, address and other information)

§ 8.5 Neither the Owner’s nor the Contractor’s representative shall be changed without ten days written notice to the other party.

§ 8.6 Other provisions:

§ 8.6.1 The Project is the 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 or by separate contractors.

§ 8.7 COMPLIANCE WITH APPLICABLE LAWS
§ 8.7.1 If the Contractor believes that implementation of any instruction received from the Owner would cause a violation of any applicable law, statute, ordinance, building code, rule or regulation, the Contractor shall notify the Owner in writing. Neither the Contractor nor any Contractor or Architect shall be obligated to perform any act which they believe will violate any applicable law, ordinance, rule or regulation. The Contractor shall be entitled to rely on the completeness and accuracy of the information contained in the Project Criteria, but not that such information complies with applicable laws, regulations and codes, which shall be the obligation of the Contractor to determine. In the event that a specific requirement of the Project Criteria conflicts with applicable laws, regulations and codes, the Contractor shall furnish Work which complies with such laws, regulations and codes. In such case, the Owner shall issue a Change Order to the Contractor unless the Contractor recognized or should have recognized such non-compliance prior to execution of this Agreement and failed to notify the Owner.

§ 8.8 BACKGROUND CHECKS
§ 8.8.1 The Owner reserves the right to require the Contractor to conduct background checks of any and all persons employed or controlled by the Contractor or any of its subcontractors or subconsultants, at any time, for any reason. If requested, the Contractor shall complete the requested background check to the Owner’s satisfaction within a reasonable time period prescribed by the Owner.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS
§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A101-2007, Standard Form of Agreement Between Owner and Contractor.

§ 9.1.2 The General Conditions are AIA Document A201-2007, General Conditions of the Contract for Construction.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

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User Notes:
§ 9.1.4 The Specifications:

(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

See Exhibit A

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Date</th>
<th>Pages</th>
</tr>
</thead>
</table>

§ 9.1.5 The Drawings:

(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

See Exhibit A

<table>
<thead>
<tr>
<th>Number</th>
<th>Title</th>
<th>Date</th>
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</table>

§ 9.1.6 The Addenda, if any:

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<thead>
<tr>
<th>Number</th>
<th>Date</th>
<th>Pages</th>
</tr>
</thead>
</table>

Portions of Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 9.

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents:

1. AIA Document E201™-2007, Digital Data Protocol Exhibit, if completed by the parties, or the following:

2. Other documents, if any, listed below:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201—2007 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

<table>
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</thead>
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<td>Exhibit B</td>
<td>Project Schedule dated</td>
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<tr>
<td>Exhibit C</td>
<td>Schedule of Values dated</td>
</tr>
<tr>
<td>Exhibit D</td>
<td>Contractor's Qualifications and Assumptions dated</td>
</tr>
<tr>
<td>Exhibit E</td>
<td>Subcontractor/Employee Master List RSA 21-1 81a</td>
</tr>
<tr>
<td>Exhibit F</td>
<td>Project Requirements dated</td>
</tr>
<tr>
<td>Exhibit G</td>
<td>General Conditions AIA A201-2007</td>
</tr>
<tr>
<td>Exhibit H</td>
<td>Community College System of New Hampshire Insurance Required of Contractors</td>
</tr>
</tbody>
</table>

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201—2007.

(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A201—2007.)

<table>
<thead>
<tr>
<th>Type of Insurance or bond</th>
<th>Limit of liability or bond amount ($0.00)</th>
</tr>
</thead>
</table>
This Agreement entered into as of the day and year first written above.

OWNER (Signature)  
(Printed name and title)

CONTRACTOR (Signature)  
(Printed name and title)
Additions and Deletions Report for
AIA® Document A101™ – 2007

This Additions and Deletions Report, as defined on page 1 of the associated document, reproduces below all text the author has added to the standard form AIA document in order to complete it, as well as any text the author may have added to or deleted from the original AIA text. Added text is shown underlined. Deleted text is indicated with a horizontal line through the original AIA text.

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 08:42:21 on 04/30/2013.

PAGE 1

Manchester Community College
1066 Front Street
Manchester, NH 03102

... 

MCGL-17 Temp Kitchen to Classrooms

... 

Jonathan Hallie, AIA, ASLA
Warrington Architects, Inc
27 Warren Street
Concord, NH 03301-4049

PAGE 2

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9. A list of Contract Documents is set forth in Exhibit A hereto.

... 

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others. The term “Work” means 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.

... 

§ 3.3 The Contractor shall perform in accordance with the Schedule attached hereto as Exhibit B and shall achieve Substantial Completion of the entire Work no later than (—) days from the date of commencement, or as follows: (Insert number of calendar days). Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work (August 23rd, 2013).

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User Notes:

(1868759826)
3.4 Liquidated Damages: If the Contractor fails to achieve Substantial Completion on the Substantial Completion Date, as that date may be modified in accordance with the Contract, the Contractor shall pay to the Owner, or the Owner may withhold amounts otherwise due, liquidated damages in the amount of three hundred sixty seven dollars ($367.00) per day for each day after the Substantial Completion Date the Contractor fails to achieve Substantial Completion of the work. The Contractor acknowledges that the liquidated damages provided by this paragraph are reasonable and not a penalty. The Contractor shall achieve Final Completion within thirty (30) days after Substantial Completion. In the event that the Contractor, without excuse, fails to achieve Final Completion within the thirty (30) days after Substantial Completion, the Contractor shall be liable to the Owner for actual damages, if any, incurred by the Owner.

§ 4.5 The Contract Sum is based upon the Schedule of Values set forth as Exhibit C and the Qualification and Assumptions set forth as Exhibit D.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month or as follows: month. The Contractor shall, not less than ten (10) business days prior to the end of each month, submit to the Owner and the Architect, a Pencil Application for Payment which projects work to be completed and paid for through the end of the month for review by Owner and the parties shall meet by the end of the month to review jointly. By the last day of the month, the Contractor shall submit an Application for Payment.

§ 5.1.3 Provided that an Application for Payment is received by the Architect-Owner not later than the last day of a month, the Owner shall make payment of the certified amount to the Contractor not later than the last day of the next month. If an Application for Payment is received by the Architect-Owner after the application date fixed above, payment shall be made by the Owner not later than 30(. ) days after the Architect-Owner receives the Application for Payment.

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the Architect-Owner may require. This schedule, unless objected to by the Architect-Owner, shall be used as a basis for reviewing the Contractor's Applications for Payment.

.1 Takes that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of five percent (5%). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™–2007, General Conditions of the Contract for Construction;
2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, 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), less retention of 5 percent (—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), less retention of five percent (5.0%);

4 Subtract amounts, if any, for which the Architect-Owner has withheld or notified a Certificate for Payment as provided in Section 9.5 of AIA Document A201–2007.

1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Architect-Owner shall determine for incomplete Work, retention applicable to such work and unsettled claims; and

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The Architect-Owner will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker. (If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect-Owner).

[ X ] Litigation in a court of competent jurisdiction

PAGE 6

Base Rate of the Bank of America or its successor plus one percent (1.0%) per annum

§ 8.6.1 The Project is the 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 or by separate contractors.

§ 8.7.1 If the Contractor believes that implementation of any instruction received from the Owner would cause a violation of any applicable law, statute, ordinance, building code, rule or regulation, the Contractor shall notify the Owner in writing. Neither the Contractor nor any Contractor or Architect shall be obligated to perform any act which they believe will violate any applicable law, ordinance, rule or regulation. The Contractor shall be entitled to rely on the completeness and accuracy of the information contained in the Project Criteria, but not that such information complies with applicable laws, regulations and codes, which shall be the obligation of the Contractor to determine. In the event that a specific requirement of the Project Criteria conflicts with applicable laws, regulations and codes, the Contractor shall furnish Work which complies with such laws, regulations and codes. In such case, the Owner shall issue a Change Order to the Contractor unless the Contractor recognizes or should have recognized such non-compliance prior to execution of this Agreement and failed to notify the Owner.

§ 8.8 BACKGROUND CHECKS

§ 8.8.1 The Owner reserves the right to require the Contractor to conduct background checks of any and all persons employed or controlled by the Contractor or any of its subcontractors or subconsultants, at any time, for any reason. If requested, the Contractor shall complete the requested background check to the Owner’s satisfaction within a reasonable time period prescribed by the Owner.

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See Exhibit A

Exhibit A - List of Contract Documents dated
Exhibit B - Project Schedule dated
Exhibit C - Schedule of Values dated
Exhibit D - Contractor's Qualifications and Assumptions dated
Exhibit E - List of Required Subcontract Provisions
Exhibit F - Project Requirements dated
Exhibit G - General Conditions AIA A201-2007
Exhibit H - Community College System of New Hampshire Insurance Required of Contractors
Certification of Document's Authenticity
AIA® Document D401™ – 2003

I, Matthew Moore, hereby certify, to the best of my knowledge, information and belief, that I created the attached final
document simultaneously with its associated Additions and Deletions Report and this certification at 09:42:21 on
04/30/2013 under Order No. 7325519060_1 from AIA Contract Documents software and that in preparing the
attached final document I made no changes to the original text of AIA® Document A101™ – 2007, Standard Form of
Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum, as published by the AIA
in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

(Signed)

(Title)

(Dated)
AIA® Document A201™ – 2007

General Conditions of the Contract for Construction

the following PROJECT: MCC13-17
Manchester Community College – TEMPORARY KITCHEN CLASSROOM RENOVATIONS

Master Owner Document SOREV 1-5-12.

THE OWNER:
Manchester Community College
1066 Front Street
Manchester, NH 03102

THE ARCHITECT:
WarrenStreet Architects
27 Warren Street
Concord, NH 03301

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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 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.

§ 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. Except as provided in section 3.18, nothing contained in the Contract Documents shall be construed to create a contractual relationship (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 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 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.

§ 1.1.9 NUMBER AND GENDER
The pronouns “they,” “them,” and “their” are used with a singular antecedent that is indefinite or that does not specific gender, in lieu of the masculine singular and feminine singular pronouns “he,” “she,” “him,” “her,” “his,” and “her,” and accordingly “they,” “them,” and “their” may be singular or plural depending on their antecedents and the context.
§ 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. All Work mentioned or indicated in the Contract Documents shall be performed by the Contractor as part of this Contract unless it is specifically indicated in the Contract Documents that such Work is to be done by others.
§ 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 In the event of conflicts or discrepancies among the Contract Documents, the documents shall be interpreted on the basis of the follow priorities: First, Modifications or Change Orders to the Contract Documents, those of later date having precedence over those of earlier date; Second, the Agreement between Owner and Contractor; Third, these General Conditions as modified; Fourth, Addenda to Specifications and Drawings, with later date having greater priority; Fifth, Specifications and Drawings.
Larger scale drawings shall take precedence over smaller scale drawings. Should Drawings or the Specifications disagree in themselves or with each other, the Contractor shall provide the better quality or greater quality of the Work unless otherwise directed by written addendum to the contract.
§ 1.2.5 All indications or notations which apply to one of the number of similar situations, material or processes shall be deemed to apply to all such situations, materials or processes wherever they appear in the Work, except where a contrary result is clearly indicated by the Contract Documents.
§ 1.2.6 Where codes, standards, requirements and publications of public and private parties are referred to in the Contract Documents, references shall be understood to be to the latest revision prior to the date bids are received or negotiations are concluded, except otherwise indicated.
§ 1.2.7 All manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the manufacturer’s written or printed directions and instructions unless otherwise indicated.
§ 1.2.8 Where the Work is to fit with existing conditions or Work to be performed by others, the Contractor shall fully and completely join the Work with such conditions or Work, unless otherwise specified.
§ 1.2.9 Exact locations of fixtures and outlets shall be obtained from the Architect before the Work is roughed in. Work installed without such information from the Architect shall be relocated at the Contractor’s expense.
§ 1.2.10 Existing condition plans and information included with the Contract Documents or otherwise made available to the Contractor were obtained by the Owner for use by the Architect in the design of the Project. The Owner does not hold out such information to the Contractor as an accurate or approximate indication of subsurface conditions, and no claim for extra cost or extension of time resulting from a reliance by the Contractor on such information shall be except allowed as provided in Section 3.7.4.
§ 1.2.11 Where no explicit quality or standards for materials or workmanship are established for Work, such Work is to be consistent with the quality of the surrounding Work and of the construction of the Project generally.
§ 1.2.12 Certain drawings (including mechanical, electrical and fire protection drawings) are diagrammatic only, and are not intended to show the alignment, physical locations or configurations of such Work. Such Work shall be

installed without additional cost to the Owner to clear all obstructions, permit proper clearances for the Work of other trades, and present an orderly appearance where exposed. Prior to beginning such Work, the Contractor shall prepare coordination drawings showing the exact alignment, physical location and configuration of the components of the mechanical, electrical, and fire protection and other allied systems and demonstrating to the Architect's satisfaction that the installation of such systems will comply with the preceding sentence. The Contractor shall be solely liable and responsible for any such costs and/or delays resulting from the Contractor's failure to coordinate such installations.

§ 1.3 CAPITALIZATION
Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, (3) the titles of other documents published by the American Institute of Architects, or (4) defined elsewhere in the Contract Documents.

§ 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 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 own or claim a copyright in the Instruments of Service. Submit or distribute 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' 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.

§ 1.6 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.

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 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.

§ 2.1.2 Intentionally omitted.

§ 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.
\textsection{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, with the Contractor's cooperation when requested, 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.

\textsection{2.2.3} The Owner shall endeavor to 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. The Owner does not hold out such information to the Contractor as accurate, and no claim for extra cost or extension of time resulting from a reliance by the Contractor on such information shall be allowed except as provided in section 3.7.4.

\textsection{2.2.4} The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness after receipt from the Contractor of a written request for such information or services. 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.

\textsection{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. The Contractor shall arrange for the reproduction of the additional Contract Documents as necessary, and the cost of such reproduction shall be included within the Contract Sum. The Owner shall cause the Architect to deliver electronic files with the Drawings to the Contractor which can be used by the Contractor to print additional sets (subject to any reasonable conditions imposed by the Architect).

\textsection{2.3} \textbf{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.

\textsection{2.4} \textbf{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 and fails within a ten-day period after 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 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.

\textsection{2.5} \textbf{Extent of Owner Approval or Consent}

Owner is relying on the Architect to exercise the appropriate standard of care in connection with the design of the Work and the Contractor for execution of the Work, including all construction means, methods and techniques. Notwithstanding anything else set forth in the Contract Documents, any "approval" or "consent" by Owner in the context of the design of the Work means only approval of programmatic and/or aesthetic design intent. In the context of execution of the Work, "approval" by Owner of schedules and/or work plans means that the Owner acknowledges such activities or events for purposes of timing or coordination only.

\textsection{2.6} \textbf{Owner-Furnished Materials, Equipment or Fixtures}

If the Contract Documents require that, as part of the Work, that Contractor shall install or incorporate into the completed construction materials, equipment or fixtures furnished by Owner, Contractor's obligations under this agreement extend to such materials, equipment and fixtures on the same basis as the rest of the Work. Contractor's
obligations to correct defective or non-conforming Work extends to and includes any and all materials, equipment, and fixtures furnished by Owner and to the installation thereof by the Contractor and the Subcontractors as fully as if such products had been purchased directly by Contractor or a Subcontractor for incorporation into the Work. The Contractor acknowledges that it has received and approved all information and specifications for any such Owner-furnished products sufficient so as to permit the Contractor to make this agreement. Such specifications for Owner-furnished materials, equipment or fixtures shall be considered a part of the Contract Documents and such items, upon delivery to, and acceptance by, Contractor, shall become a part of the Work.

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.

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

§ 3.1.3 The Contractor shall not relieve of obligations to perform the Work in 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 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR
§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of 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. Before starting the Work, and at frequent intervals during the progress thereof, the Contractor shall carefully study and compare the Contract Documents with each other and with the information furnished by the Owner pursuant to section 2.2 and shall at once report to the Architect any error, inconsistency or omission the Contractor may discover. Any necessary change shall be ordered as provided in Article 7, subject to the requirements of section 1.2 and other provisions of the Contract Documents. If the Contractor proceeds with the Work without such notice to the Architect, having discovered such errors, inconsistencies or omissions, or if by reasonable study of the Contract Documents the Contractor should have discovered such, the Contractor shall bear all costs arising therefrom.

§ 3.2.1.1 The Drawings are generally drawn to scale; however, the figured dimensions or notes thereon shall govern. Before ordering any materials or doing any Work, the Contractor and each Subcontractor shall verify all measurements at the building site, and shall be responsible for the correctness of same. No extra charge or compensation will be allowed on account of differences between the actual measurements and the dimensions indicated on the Drawings, except to the extent such differences are attributable to errors and omissions in the Contract Documents prepared by the Architect of which the Contractor is not aware (unless the Contractor should have been aware of such errors and omissions in connection with its exercise of the standard of care exercised by a reasonable contractor experienced in the type of work required) and for which correction would constitute a material change in the Work per the process set forth in Section 7.1.4 below. All differences which may be found shall be reported in writing to the Architect for consideration before proceeding with the Work. The Contractor shall give the Architect timely notice of any additional Drawings, Specifications, or instructions required to define the Work in greater detail, or to permit the proper progress of the Work.

§ 3.2.1.2 The Contractor shall not proceed with any Work not clearly and consistently defined in detail in the Contract Documents, but shall request additional Drawings or instructions from the Architect. If the Contractor proceeds with such Work without obtaining further Drawings, Specifications, or instructions, the Contractor shall correct Work performed incorrectly at the Contractor’s own cost and expense.
§ 3.2.3 Intentionally omitted.

§ 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 Section 3.2.2, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Section 3.2.2, 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.

§ 3.3 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 (including all safety precautions and programs) and for coordinating all portions of the Work under the Contract. 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 believes that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall (a) give timely written notice to the Owner and Architect of the specific means, methods, techniques or procedures referred to in the Contract Documents that the Contractor believes are not safe or suitable; (b) participate in discussions with the Owner and the Architect regarding the specific means, methods, techniques or procedures referred to in the Contract Documents that the Contractor believes are not safe or suitable and (c) shall not proceed with that portion of the Work until the Owner, the Architect and the Contractor have agreed upon specific means, methods, techniques or procedures that the Contractor agrees are safe and suitable for the Work. The Contractor shall remain solely responsible for and have control over the means, methods, techniques or procedures that are employed by the Contractor for the Work, notwithstanding that such construction means, methods, techniques, sequences or procedures are (i) referred to, indicated or implied by the Contract Documents or (ii) agreed to by the Architect or Owner. In no event shall the Contractor employ construction means, methods, procedures and techniques that violate (x) requirements of any warranties applicable to the Work or (y) laws, ordinances, regulations, rules and orders which bear upon the Contractor's performance of the Work.

§ 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. Nothing contained in this section shall alter the relationship between the Contractor and each Subcontractor under the applicable subcontract with respect to each such Subcontractor's obligation for safety for persons or property.

§ 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 and supervise the Work performed by Subcontractors to the end that the Work is carried out without conflict between trades and so that no trade, as a result of improper coordination or supervision, causes delay to the general progress of the Work. The Contractor and all Subcontractors shall at all times afford each trade, any separate contractor, or the Owner, every reasonable opportunity for the installation of Work and the storage of materials.

§ 3.3.5 The Contractor shall arrange for and attend job meetings with the Owner and the Architect and such other persons as the Architect or Owner may from time to time wish to have present. The Contractor shall be represented by a principal, project manager, general superintendent or other authorized main office representative, as well as by the Contractor's own superintendent. An authorized representative of any Subcontractor or lower tier subcontractor shall attend such meetings if the representative's presence is required by the Owner or the Architect. Such representatives of the Contractor and the Subcontractors shall be empowered to make binding commitments on all
matters to be discussed at such meetings, including costs, payments, change orders, time schedules and manpower. Any notices required under the Contract may be served on such representatives.

§ 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. The word "provide" shall mean furnish and install complete, including connections, unless otherwise specified.

§ 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. If the Contractor desires to substitute a product or method in lieu of what has been specified or shown in the Contract Documents, the Contractor may propose to do so in a written request to the Architect setting forth the following: (1) full explanation of the proposed substitution and submittal of all supporting data including technical information, catalog cuts, warranties, test results, installation instructions, operating procedures, and other like information for the original specified item and the proposed substitution as necessary for a complete evaluation of the substitution; (2) reasons why the substitution is advantageous or necessary, including the benefits to the Owner and the Work in the event the substitution is acceptable; (3) the adjustment, if any, in the Contract Sum in the event that substitution is acceptable; and (4) the adjustment, if any, in the Contract Time in the event that substitution is acceptable. Proposals for substitutions shall be submitted to the Architect with a copy to the Owner, not later than 30 days prior to the time of such substitute product or method would be incorporated in the Work or, if to be used or incorporated within 30 days of the commencement of the Work, immediately upon execution of the Agreement. No substitutions will be considered or allowed without the Contractor's submittal of complete substantiating data and information as stated herein. Approval of a proposed substitution shall be at the sole discretion of the Owner (after consulting with the Architect).

§ 3.4.2.1 By making a request for substitution, the Contractor: (1) represents that the Contractor has investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified; (2) represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified; (3) certifies that the cost data presented is complete and includes all related costs under this Contract except the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent; and (4) will coordinate the installation of the accepted substitute, making such changes as may be required for the work to be complete in all respects.

§ 3.4.2.2 The Contract Documents are intended to produce a build-out of consistent character and quality of design. All components of the building, including visible items of mechanical and electrical equipment, have been selected to have a coordinated design in relation to the overall appearance of the building. The Architect shall judge the design and appearance of proposed substitutes on the basis of their suitability in relation to the overall design of the Project, as well as for their intrinsic merits. The Architect will not approve as equal to materials specified proposed substitutes which, in the Architect's opinion, would be out of character, obstructive, or otherwise inconsistent with the character and quality of design of the Project. In order to permit coordinated design of color and finishes, the Contractor shall, if required by the Architect, furnish the substituted material in any color, finish, texture, or pattern which would have been available from the manufacturer originally specified, at no additional cost to the Owner.

§ 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. The Owner may require removal of any workers from the Project that it deems unfit or not beneficial to the Project. The Owner reserves the right to require the Contractor to perform a background check of any worker employed by the Contractor and any of its subcontractors. If so request, the Contractor shall perform the background check to the Owner's satisfaction and shall provide the results to the Owner within a reasonable time period established by the Owner.
§ 3.4.4 All manufactured materials shall be ordered to be delivered in the manufacturer’s original, unbroken packages, containers or bundles, bearing the name of the manufacturer and brand name of other designation, and all materials shall be handled, stored, installed, cleaned and protected in accordance with the manufacturer’s directions, unless otherwise indicated in the Contract Documents.

§ 3.4.5 Any product, material or equipment specified in the Contract Documents by reference to the number, symbol or title of a specified standard, such as a commercial standard, federal specification, trade association standard, or other similar or related construction industry standard, shall comply with requirements in the latest revision thereof as of the date the Owner and the Contractor execute the Agreement.

§ 3.4.6 In all cases in which a manufacturer’s name, trade name or other property designation is used in the Contract Documents in connection with a material, equipment or product to be furnished thereunder, the Contractor shall furnish the material, equipment or product of the named manufacturer(s) unless a written request for substitution is made in accordance with section 3.4.2 and the substitution is approved in writing by the Owner.

§ 3.4.7 The Contractor and all Subcontractors shall make all provisions necessary to avoid any disputes with labor unions and shall be responsible for any delays, damages or extra costs incurred as a result of such disputes. The Contractor shall be responsible for the maintenance of harmonious labor relations among its employees and the employees of its Subcontractors in such manner as will provide for harmony as far as practical among workers at the Project site. Prior to contracting with any Subcontractor, the Contractor will require such Subcontractor to certify its willingness to cooperate with not only the other Subcontractors hired by the Contractor, but also with the Owner, Architect, any other contractors hired by the Owner, and their subcontractors. Any Subcontractor not cooperating shall, at the Owner’s reasonable discretion, be dismissed by the Contractor and a qualified replacement subcontractor shall be hired at the Contractor’s expense.

§ 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 will 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. 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.

§ 3.5.2 The Contractor shall be responsible for determining that all materials furnished for the Work meet all requirements of the Contract Documents. The Architect may require the Contractor to produce reasonable evidence that materials used meet such requirements, such as certified reports or test results by qualified testing laboratories, reports of studies by qualified experts, or other evidence which, in the opinion of the Architect, would lead to a reasonable certainty that any material used, or proposed to be used, in the Work meets the requirements of the Contract Documents. All such data shall be furnished at the Contractor’s expense.

§ 3.5.3 The warranty provided in this section 3.5 shall be in addition to and not in limitation of any other warranty required by the Contract Documents or otherwise provided by law.

§ 3.5.4 The Contractor hereby assigns to the Owner, effective at the time of Substantial Completion of the Work, any and all manufacturer’s warranties required by the Contract Documents relating to materials and labor used in the Work and further agrees to perform the Work in such manner so as to preserve all such manufacturer’s warranties.

§ 3.5.5 The Contractor shall procure and deliver to the Architect, prior to final payment, all special warranties required by the Contract Documents. Delivery by the Contractor shall constitute the Contractor’s guarantee to the Owner that the warranty will be performed in accordance with its terms and conditions.
§ 3.6 TAXES
The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, 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. The Contractor shall apply for required licenses, permits, inspections and/or approvals sufficiently in advance of the time required to allow the Contractor and/or the Architect to respond to any municipal comments, conditions or requests (including, without limitation, changes to the Work) without delaying the progress of the Work.

§ 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 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.

§ 3.7.4 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 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.

§ 3.7.6 The Contractor shall be responsible for familiarizing itself with the regulatory requirements governing the disposal of material, including material containing pollutants, from the site. The Owner will not recognize claims for additional disposal costs that could reasonably have been anticipated at the time of bidding.

§ 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,
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. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect 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 requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection. The Owner may require the Contractor to provide additional supervision to assist the superintendent when Owner determines the workload requires it.

§ 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. The Contractor shall remove the superintendent if requested to do so in writing by the Owner, and shall promptly replace him with a competent person reasonably acceptable to the Owner.

§ 3.9.4 The superintendent shall keep a daily log of the progress of the Work and make it available to the Owner at all times. A copy of the log shall be submitted to the Owner upon completion of the Project. Additionally, daily field reports recording work activities, labor force and other information as required by the Owner shall be prepared daily by the Contractor and each subcontractor and submitted to the Owner.

§ 3.9.5 The Contractor shall furnish to both the Owner and the Architect the names, addresses and telephone numbers of the project manager, the superintendent, the superintendent's immediate supervisor, the superintendents of all subcontractors, and at least two other of their and their subcontractor's authorized representatives, indicating where they can be contacted at times other than normal working hours in case of emergency.

§ 3.9.6 The Contractor's superintendent shall not be assigned to, or become involved in, any project other than that of this Contract. He/she shall remain in attendance at the site, and, except for illness or other reason excusable to the Owner, shall be present at all times when Work of any kind is being done, including Work done during overtime. If absent for illness or other reason excusable to the Owner, a replacement having full authority and responsibility of the full-time superintendent shall be provided.

§ 3.9.7 The Contractor shall coordinate and supervise the Work performed by Subcontractors to the end that the Work is carried out without conflict between trades and so that no trade, at any time, causes delay to the general progress of the Work. The Contractor and all Subcontractors shall at all times afford each trade, any separate contractor, or the Owner, every reasonable opportunity for the installation of Work and the storage of materials.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES
§ 3.10.1 The Contractor, promptly after being awarded the Contract, or in the case of a GMP as part of the GMP Proposal, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work (the "Schedule"). 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 Schedule shall utilize the Critical Path Method of scheduling within a format acceptable to the Owner and shall be submitted in digital and hardcopy (paper or vellum) formats. The Schedule shall be developed with and shall be subject to approval by the Owner and shall: (i) comply with and include any the Milestone Dates required by the Contract Documents, including but not limited to Substantial Completion and Final Completion for each phase of Work, along with any other Milestone Dates as required by the Owner; (ii) show the Contractor's overall approach to the planning, scheduling and execution of the Work, including schedule activities for all Work components ("Activities"). Notice to Proceed, procurement of permits, shop drawing submittals, review and approval, anticipated design submittals, materials and equipment procurement and delivery, third party interfaces (e.g., utility work), and closeout and commissioning; (iii) include only Activities with durations equal to or less than ten (10) calendar days; (iv) include logic relationships between Activities reflecting the Contractor's as-planned scheduling of Work; and (v) identify any planned overtime.

§ 3.10.1.2 The Contractor shall monitor the progress of the Work for conformance with the requirements of the Schedule and shall promptly advise the Owner of any actual delays or potential delays. The Contractor shall deliver a written report to the Owner each month (or more frequently if requested by the Owner or the Architect) setting forth the actual progress of the Work and highlighting discrepancies between the actual progress of the Work and the Schedule (such updates are sometimes referred to in these General Conditions as "Progress Reports"). In the event any progress report indicates delays in achievements of any Milestone Date, the Contractor shall propose in written form an affirmative plan (the "Corrective Plan") to correct the delay, including overtime, re-sequencing of Work and/or additional labor, if necessary, which Corrective Plan shall indicate the date by which the progress of the work will comply with the Schedule, and shall be subject to the approval of the Owner. In no event shall any progress report or Corrective Plan constitute an adjustment in the Schedule, Contract Time or any Milestone Date unless any such adjustment is agreed to by the Owner and authorized pursuant to a Change Order.

§ 3.10.1.3 In the event: (i) that the performance of the Work as of a Milestone Date has not progressed or reached the level of completion required by the Schedule, and (ii) the Contractor fails to submit a Corrective Plan that is approved by the Owner or the progress of the Work is not brought back into compliance with the Schedule on the date proposed by an approved Corrective Plan, the Owner shall have the right to order the Contractor to take corrective measures to expedite the progress of the work, including, without limitation, (1) supplying additional shifts or overtime, (2) supplying the additional manpower, equipment, and facilities, (3) re-sequencing of Work, and (4) other similar measures (hereinafter referred to collectively as "Extraordinary Measures"). Such Extraordinary Measures shall continue until the progress of the Work complies with the stage of completion required by the Contract Documents. The Owner's right to require Extraordinary Measures is solely for the purpose of ensuring the Contractor's compliance with the Schedule. The Contractor shall not be entitled to an adjustment in the Contract Sum in connection with Extraordinary Measures required by the Owner under or pursuant to this Section 3.10.1. The Owner may exercise the rights furnished the Owner under or pursuant to this Section 3.10.1 as frequently as reasonably necessary to ensure that the Contractor's performance of the work complies with the Schedule.

§ 3.10.1.4 In conjunction with the monthly Schedule submission, the Contractor shall draft and submit to the Owner a narrative explaining in detail all changes to the previous Schedule, lack of progress, delays, slippage or accelerations. The Owner at any time may require the Contractor to develop and submit an additional written mitigation plan based on feasible field actions that shall address and correct such delays, progress impediments, schedule slippage or missed Milestone Dates.

§ 3.10.1.5 Float or slack time associated with any one chain of activities is defined as the amount of time between the earliest start date and the latest start date or between the earliest finish date and the latest finish date for such activities, as set forth in the Schedule required under this Agreement, including any revisions or updates thereto. The Owner shall retain all beneficial rights to all schedule float including that resulting from any scheduled or actual completion in less than the Contract Time. The Contractor shall in no way be entitled to any compensation for any Claims for interference with or denial of an "early finish" or "early completion" of the Work. Extensions of time for performance will be granted only to the extent that the equitable time adjustments for the activity or activities affected exceed the total float along the activity chain involved at the time the change was ordered or the delay
occurred. Notwithstanding the above, the Contractor shall only be entitled to an extension of time for an excusable delay to the critical path of the Work.

§ 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.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE
The Contractor shall maintain at the site one record copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to record field changes and selections made during construction (the "As-built Documents"), and one record copy of approved Shop Drawings, Product Data, Samples and similar required submittals. The markups to the As-Built Documents shall consist of record information including: (i) deviations from the Drawings made during construction; (ii) details in the Work not previously shown; (iii) changes to existing conditions or existing conditions found to differ from those shown on the Drawings; (iv) the actual installed position of equipment, piping conduits, light switches, electric fixtures, circuiting, ducts, dampers, access panels, control values, drains, openings, and stub-outs; and (v) such other information as the Owner may reasonably request. The Architect and/or the Owner's Representative (a) make routine edits and updates to the Drawings prepared by or on behalf of the Architect that are normal in the course of construction administration at mutually acceptable times during construction of the Project and (b) deliver such updated Drawings to the Contractor (in printed and electronic form) for use by the Contractor in preparing the Record Documents (subject to any reasonable conditions imposed by the Architect or Owner's Representative). Upon completion of the Work, the Contractor shall deliver to the Architect the marked As-Built Documents and reproducible transparencies thereof. Approval by the Architect, Owner's Representative, and the Owner of As-Built Documents prepared by the Contractor and its Subcontractors and suppliers shall be a condition precedent to the Owner's obligation to make final payment to the Contractor. The Contractor shall deliver to the Architect all operation manuals for equipment as a condition precedent to final payment by Owner.

§ 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. 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.
§ 3.12.8 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. The accuracy of all such information is the responsibility of the Contractor. In reviewing Shop
Drawings, Product Data, Samples, and similar submittals, the Architect shall be entitled to rely upon the
Contractor’s presentation that such information is correct and accurate.

§ 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. The portions of the Work that are the subject of the approved submittal shall be
completed in accordance with such approved submittal.

§ 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.
Unless such written notice has been given, the Architect’s approval of resubmitted Shop Drawing, Product Data,
Sample, or similar submittal shall not constitute approval of any changes not requested on the prior submittal.

§ 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.

§ 3.13 USE OF SITE
The right of possession of the premises and the improvements made thereon by the Contractor shall remain at all
times in the Owner. The Contractor’s right to entry and use thereof arises solely from the permission granted by the
Owner under the Contract Documents. The Contractor shall confine the Contractor’s apparatus, the storage of
materials, and the operations of the Contractor’s workers to limits indicated by law, ordinances, the Contract
Documents and permits and/or directions of the Architect and/or the Owner and shall not unreasonably encumber
the premises with the Contractor’s materials. The Owner shall not be liable to the Contractor, Subcontractors, their
employees or anyone else with respect to the condition of the premises. The Owner shall have the right to refuse
admittance to the site to any agent or employee of the Contractor or Subcontractors whose presence the Owner
deems hostile to the Owner’s interest.
§ 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 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. Existing work that is cut, damaged, disturbed or otherwise interfered with by the Contractor, a Subcontractor, or anyone for whom they are responsible shall be fully, properly and carefully repaired by the responsible Contractor or Subcontractor. All such repairs shall be completed in a first-class manner to the satisfaction of the Architect, and shall match similar existing adjoining 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. Immediately prior to the Architect’s inspection for Substantial Completion, the Contractor shall completely clean the premises. Concrete and ceramic surfaces shall be cleaned and washed. Resilient coverings shall be cleaned, waxed and buffed. Woodwork shall be dusted and cleaned. Sash, fixtures and equipment shall be thoroughly cleaned. Stains, spots, dust, marks and smears shall be removed from all surfaces. Hardware and all metal surfaces shall be cleaned and polished. Glass and plastic surfaces shall be thoroughly cleaned by professional window cleaners. All damaged, broken or scratched glass or plastic shall be replaced by the Contractor at the Contractor’s expense.

§ 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 safe 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 manufacturer 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 defend (with counsel reasonably satisfactory to Owner), indemnify and hold harmless the Owner, Architect, Architect’s consultants, its lenders and affiliates, 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), caused in whole or in part 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 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 a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

§ 3.19 LIENS

§ 3.19.1 In the event that any Subcontractor, supplier or any other party for whom the Contractor is responsible establishes a lien against the Work and/or the Project site, the Contractor shall, within five days of receipt of notice from the Owner regarding such lien, cause the lien to be discharged (either by obtaining and recording a lien discharge bond from a surety and in a form acceptable to the Owner or otherwise) at no cost to the Owner, except to the extent that the lien is directly and solely attributable to a failure by the Owner to pay undisputed amounts to the Contractor as and when due under the Contract Documents. If the Contractor fails to cause the lien to be discharged within such five day period, the Owner shall have the right to withhold all further payments to the Contractor until the lien is discharged. The Owner may either (a) apply amount so withheld to discharging such lien or (b) retain such amounts remaining after payment of the fees and expenses the Owner incurs in connection with such lien. The Contractor agrees to indemnify and hold harmless the Owner from all costs and expenses incurred by the Owner in connection with such liens. For purposes of this Section 3.19.1, the term "lien" shall mean any instrument filed with the applicable land title records which creates or perfects a lien under any lien law.

§ 3.20 PROTECTION FROM WATER DAMAGE

§ 3.20.1 In performing the Work, the Contractor shall exercise diligent efforts to protect the building and to cause all materials, supplies, systems and equipment which are delivered to the Project site from exposure to, and damage from, water. Without limiting the generality of the foregoing, the Contractor shall (a) install temporary barriers adequate to prevent water entry to the building from openings in the roof, exterior walls or other applicable building elements to the extent related to the Work, (b) cause all materials, supplies, systems and equipment which are delivered to the Project site to be stored in a safe and secure location, packaged in a watertight manner where possible, and stored in a manner which protects such items from inclement weather, the elements (including, without limitation, rain, snow and water damage) and other damage until such items are incorporated into the work, and (c) ensure that all plumbing components and exterior elements included within the Work are constructed and installed in accordance with the Contract Documents so as not to allow water leaks or penetration.

§ 3.20.2 In addition to (and not in limitation of) the indemnification obligations of Contractor set forth in Section 3.18 above, Contractor shall defend, indemnify and hold harmless the parties indemnified under Section 3.18.1 above to the fullest extent permitted by law from all Claims arising out of or resulting from the failure of Contractor or any subcontractor of any tier to comply with the provisions of this Section 3.20. The foregoing indemnification shall include, without limitation, any Claim attributable to (i) bodily injury, sickness, disease or death arising out of or relating to, and (ii) the costs of any abatement, clean-up, removal and disposal (to the satisfaction of Owner) of any mold, fungal growth, spores or the like which occurs at the Project site as a result of any failure by Contractor or any subcontractor of any tier to comply with the provisions of this Section 3.20.

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.

§ 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 as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.
§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents until the date the Architect issues the final Certificate For Payment. The Architect will have authority to act on behalf of the Owner only in 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 has 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 not involving an adjustment in the Contract Sum or an extension of the Contract Time. 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.

§ 4.2.11 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.

§ 4.2.12.1 The Architect may, as the Architect judges desirable, issue additional drawings or instructions indicating in greater detail the construction or design of the Work. Such drawings or instructions may be effected by field order or other notice to the Contractor, and provided such drawings or instructions are reasonably consistent with the previously existing Contract Documents, the Work shall be executed in accordance with such additional drawings or instructions without additional cost or extension of the Contract Time. If the Contractor claims additional cost or time on account of such additional drawings or instructions, the Contractor shall give the notice provided in Article 15.

§ 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 and the agreement of the owner.

§ 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.

ARTICLE 5 SUBCONTRACTORS
§ 5.1Definitions
§ 5.1.1 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.

§ 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 and of complying with bonding, insurance and other applicable requirements under the Contract Documents, 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.

§ 5.2.5 The form and content of each subcontract shall be submitted to the Owner for its approval, which shall not be unreasonably withheld or delayed. Each subcontract shall expressly provide for the contingent assignment referred to in Section 5.4.1.

§ 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 without limitation the responsibility for safety of the Subcontractor’s Work and the obligations set forth in Section 3.18, which the Contractor, by these Documents, assumes toward the Owner and Architect. 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. Each subcontract agreement shall state that (1) the Subcontractor agrees that the Contractor’s rights under the subcontract agreement may (a) be assigned to the Owner, subject to the conditions of Section 5.4.1 of these General Conditions, (b) include agreements to mediate consistent with those in the Contract Documents and (c) be terminated without penalty or premium if the Contractor’s services are terminated. By entering into a subcontract for any portion of the Work, a Subcontractor shall be deemed to have agreed to the terms of the preceding sentence as if such terms were included in its subcontract agreement, and (2) the Subcontractor shall be required to perform its Work in accordance with all applicable laws, statutes, ordinances, building codes, rules and regulations without any adjustment to the subcontract amount or time for performance.

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

§ 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.

§ 5.5 Contractor will require each Subcontractor to employ a competent superintendent, or trade foreman who shall be in attendance at the Project site during the progress of Subcontractor’s Work.

ARTICLE 8 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 under Conditions of the Contract identical or substantially similar to these 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.

§ 6.1.2 Notwithstanding anything to the contrary, the Owner shall have the right to install fixed and loose furniture, furnishings, fixtures, data communications lines, equipment and other items during the Contractor’s performance of the Work or portion(s) thereof. The Owner and the Contractor shall cooperate in scheduling and coordinating any such activities by or on behalf of the Owner. Any such installation or activities by or on behalf of the Owner shall not be deemed as acceptance of any part of any Work not completed in accordance with the Contract Documents.

§ 6.1.3 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.

§ 6.1.4 Intentionally omitted.

§ 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.
§ 8.2.3 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 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.

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

§ 8.2.5 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.

§ 8.3 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 the Architect will allocate the cost among those responsible.

ARTICLE 7  CHANGES IN THE WORK
§ 7.1 GENERAL
§ 7.1.1 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 If, subsequent to execution of the Agreement, the Architect issues any proposal requests, supplemental instructions, sketches and other materials intended to further define, clarify or modify the Contract Documents (collectively, the "Supplemental Material") Contractor shall, within ten (10) days of receiving any Supplemental Material, notify the Architect and Owner's Representative in writing of any error, inconsistency or discrepancy that the Contractor discovers between the Supplemental Materials and the Contract Documents and indicate whether the Supplemental Material have any impact upon the Contract Sum and/or the Contract Time. Failure of the Contractor to provide such notice is hereby deemed to mean: (1) such Supplemental Materials are consistent with the Contract Documents; (2) do not result in a change in the Contract Sum and/or Contract Time; and (3) Contractor is willing and able to perform all of the Work for the Contract Sum, and in accordance with all the requirements of the Contract Documents. If the Contractor notifies the Owner's Representative and Architect that it believes the Supplemental Materials are either inconsistent with the Contract Documents and/or represent added Work or will delay performance in accordance with the Project schedule, the Owner's Representative and Architect will review the Contractor's response and provide the Owner with recommendations for approval or disapproval, and the Owner shall have one or more of the following options:

(a) The Owner may direct the Architect to modify that aspect of the Supplemental Materials to which the Contractor objects. The Contractor shall cooperate with the Owner, Owner's Representative and the Architect during the modification effort and shall make recommendations appropriate to correct such portions of the Supplemental Materials. The Architect shall submit to the Contractor the revised Supplemental Materials as approved by the Owner. The Contractor shall promptly reexamine such revised Supplemental Materials as described in Section 7.1.4;

(b) If, upon review of the Contractor's notice, the Owner (after consultation with the Architect and Owner's Representative) believes that the portion of the Work described therein does not constitute a material change in the Work, or disagrees as to the impact claimed by the Contractor to the Contract Sum or Contract Time,
as applicable, the Owner may advise the Contractor through the Owner's Representative or Architect. If such disagreement is not promptly resolved, the Work subject to disagreement shall be identified in a schedule (the "Disputed Work Schedule"). Whenever possible, the Owner and the Contractor shall resolve items set forth in the Disputed Work Schedule confirming such resolution in Change Orders. Items in the Disputed Work Schedule that are not resolved by the Owner and the Contractor shall be subject to the dispute resolution procedures set forth in Article 15. During the pendency of such dispute resolution procedures, all items remaining in the Disputed Work Schedule shall be performed by the Contractor as required by the Contract Documents and a tentative adjustment shall be made to the Contract Sum to the extent of any undisputed aspect of the item. No adjustment shall be made to the Contract Sum for any disputed item or portion of an item. For each remaining item in the Disputed Work Schedule, the Contractor shall keep a specific, detailed accounting of the time and materials required to complete such item. Adjustments to the Schedule shall not be permitted on a tentative basis; or

(c) If, upon review of such notice from Contractor, the Owner agrees that all or a portion of the Work therein entitles the Contractor to Change Order and the Owner elects not to direct the Architect to modify the Supplement Materials, the Owner and the Contractor shall enter into a written Change Order providing for such agreed changes to the Contract Sum and/or Contract Time, as applicable.

§ 7.1.5 Unless otherwise agreed to by the Owner, the aggregate limitation on the amount of profit and overhead that the Contractor, each Subcontractor and all lower tier subcontractors and suppliers can charge for Work performed pursuant to Change Orders and Construction Change Directives shall be as follows: (a) for the Contractor for Work performed by the Contractor's own forces, ten percent (10%) of the cost of the Work; (b) for the Contractor for Work performed by Subcontractors, five percent (5%) of the cost of such Work; (c) for each Subcontractor for Work performed by such Subcontractor's own forces, ten percent (10%) of the cost of such Work for overhead and for profit; and (d) for each Subcontractor for Work performed by lower tier subcontractors, five percent (5%) of the cost of such Work for overhead and for profit. This aggregate combined profit and overhead amount shall include all other markups and non-direct costs.

§ 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 Unless expressly reserved therein, an executed Change Order shall constitute a final settlement of all matters relating to the change in the Work which is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change, any adjustments to the Contract Sum or GMP and any adjustments to the Schedule, Contract Time and/or Milestone Dates.

§ 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.

§ 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;
§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed 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.

§ 7.3.5 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.

§ 7.3.8 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 agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 Failure of the Contractor to notify the Owner of any disagreement with any proposed adjustment to the Contract Sum or Contract Time, as applicable, or method for determining them set forth in a Construction Change Directive within ten days after the date of receipt by the Contractor of such Construction Change Directive shall be deemed to be an agreement by the Contractor to the proposed adjustment to the Contract Sum or Contract Time or method for determining them set forth in such Construction Change Directive. If the Contractor disagrees in writing on a timely basis 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 the parties performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit in accordance with Section 7.1.5 above. 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. If the Owner and the Contractor fail to agree on the adjustment to the Contract Sum or Contract Time, as applicable, or method for determining them arising from any Construction Change Directive, (a) the adjustment to the Contract Sum shall be the net increase or decrease in the Cost of the Work attributable to the Construction Change Directive plus mark-up per Section 7.1.5 and (b) the adjustment to the Contract Time shall be equal to the net increase or decrease (if any) in the time required to perform the entire Work attributable to the Construction Change Directive. As used in this Section, the term "Cost of the Work" for Contractor shall mean the Cost of the Work as defined in the Agreement and for Subcontractors as defined in Section 7.6. Any disagreement as to the determination of such items that are not resolved by the Owner and the Contractor shall be subject to the dispute resolution procedures set forth in Article 15 of these General Conditions of the Contract.

§ 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.

§ 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.

§ 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.

§ 7.5 BACK-UP FOR CHANGE ORDERS
§ 7.5.1 Lump Sum Proposal: The Contractor, Subcontractor or lower tier subcontractor’s proposal covering the extra Work or change will be itemized for the various components or Work and segregated by labor, material and equipment in a detailed format satisfactory to the Owner. Such format will include a material and labor quantity take-off and related pricing information and extensions (by drawing, if applicable). The Contractor will furnish his itemized lump sum proposal and the similarly detailed proposals of any Subcontractors, lower tier subcontractors or material suppliers.

§ 7.5.2 Time and Material: Should the Owner elect to have the extra Work or change performed on a time and material basis, and so notify the Contractor in writing, the Contractor, Subcontractor or lower tier subcontractor shall perform the Work in such manner. Records supporting the actual cost of the Work (as defined in the Section 7.6) performed must be kept and forwarded to the Owner’s representative. Such records include, but are not limited to, material tickets for all actual material used, daily time sheets itemizing workmen’s names and hours worked for all actual labor costs, and such other evidence as the Owner’s representative may reasonably request. Owner may require authentication of all time sheets and material tickets. If so requested, the failure to provide such authentication may constitute a waiver of any rights to payment of the Contractor, Subcontractor or any lower tier subcontractor for the extra Work or change performed.

§ 7.5.3 Unit Prices: The Contractor, Subcontractor or lower tier subcontractor’s proposal shall itemize the quantities of each item of Work for which there is an applicable unit price. The quantities must be itemized in relation to each specific Contract Drawing.

§ 7.6 ACTUAL COST OF THE WORK FOR SUBCONTRACTORS
§ 7.6.1 If performed on a time and material basis, the Actual Cost of the Work for a Subcontractor shall comprise the following elements:

§ 7.6.1.1 Direct Job Costs for Labor: The number of hours, hourly payroll cost, labor burden (as defined in 7.6.1.2) and extended totals for each item of Work to arrive at the cost for direct jobsite labor including working foremen. All other administration, clerical expense and supervision above the level of working foremen (such as general foremen, superintendent, project manager, etc.) shall be considered covered by the Subcontractor’s mark-up per Section 7.1.5.

§ 7.6.1.2 Labor Burden: The employer’s net actual cost of payroll taxes (FICA, SUTA, FUTA), net actual cost of union benefits, and net actual cost for workers’ compensation insurance, taking into consideration adjustments for experience modifiers, premium discounts, dividends, rebates, etc. Labor burden shall not be considered to include costs of Commercial General Liability Insurance, auto insurance or umbrella insurance which shall be considered covered by the Subcontractor’s mark-up per Section 7.1.5.

§ 7.6.1.3 Direct Job Costs for Materials & Equipment: The quantity, price and extended totals for each item of Work to arrive at the costs of direct material and equipment. Appropriate amounts may be included for the rental of major equipment (defined as tools and equipment with individual purchase costs of more than $1,000) specifically needed to perform the extra Work or change. Use of small tools (defined as tools and equipment with individual purchase costs of less than $1,000) is considered covered by the mark-up percentage to be added to the direct cost of the extra work or change. Cost, for construction equipment, shall be the lower of the total expected rental cost or ownership cost equivalent including transportation charges and all applicable taxes.

§ 7.6.2 If performed on a unit price basis, the Actual Cost of Work shall comprise the following elements:

§ 7.6.2.1 Unit prices are for Work complete, measured in place (i.e., actual quantity installed) and cover profit and all other costs and expenses of the Contractor, Subcontractor or lower tier subcontractor. Unit prices include, without limit, all conditions of the Contract and all general requirements such as layout, reproduction of Drawings
and Specifications, testing and inspection, shop drawing and sample coordination, supervision (field and home office), small tools and expendable items, insurance, taxes, temporary facilities and services, including access and safety provisions, "as-built" drawings, and general and administrative overhead and profit.

§ 7.5.2.2 Unit Price Application: For unit price items, additions and deletions of like items shall be algebraically summed and then multiplied by the applicable unit prices.

§ 7.5.3 Any changes undertaken without the Architect's or the Owner's authorization will not be recognized as a basis for a Claim for extra cost at a later date. If the Contractor claims that any instructions or orders, whether oral, written, by drawings, or otherwise, involve extra cost or time, and such instructions or orders are not accompanied by a written acknowledgement by the Owner or the Architect that extra payment will be made or time extended, they shall promptly so notify the Architect in writing and should not proceed with the Work until they have received a further written order to proceed, except in cases of emergency affecting life or property. No claim for extra cost or time on account of such instructions shall be valid unless the Contractor has so notified the Architect, before proceeding, that they claim extra cost and time and has received the further written order from the Owner's representative to proceed.

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.

§ 8.3 DELAYS AND EXTENSIONS OF TIME
§ 8.3.1 If the Contractor is delayed at any time in the 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 area-wide labor disputes not directed expressly at Contractor or any Subcontractor, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Construction Change Directive for such reasonable time as the Architect may determine. The Contractor acknowledges and agrees that (a) no adjustments to the Contract Time shall be made unless the events described above shall have the effect of actually delaying completion of components of the Work on the critical path indicated in the Schedule and (b) adjustments to Milestone Dates and/or the Contract Time will be permitted in connection with any such delay only to the extent such delay (i) is not caused, or could not have been avoided, by the Contractor, (ii) could not be limited or avoided by the Contractor's timely notice to the Owner of the delay, (iii) has an impact of at least one (1) day and (iv) has no concurrent or contributing cause for which the Contractor would not be entitled to an extension of the Contract Time. Notwithstanding anything to the contrary, the Contractor shall
not be entitled to any extension in the Contract Time for delays in receiving required licenses, permits, inspections or approvals unless the Owner is required to provide or obtain such licenses, permits, inspections or approvals.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15 and this section 8.3.2 through section 8.3.8 below. Contractor's written Claim for extension of Contract Time shall be accompanied by detailed dates, correspondence, notices, and any other data which provides proof of the events which are the basis for the Claim, including a network analysis justifying the time extension. Said network analysis shall specifically detail the extension of the critical path of the Project caused by the events which underlie the time extension request.

§ 8.3.3 Should the Contractor be delayed in the performance of the Work, the Contractor shall (a) notify the Owner and the Architect in writing within three (3) days following the event or occurrence causing such delay and (b) notify the Owner and the Architect of the estimated extent of the delay and the cost, if any, which may be incurred as result of the delay within twenty-one (21) days following the event or occurrence causing such delay. If the Contractor fails to so notify the Owner and the Architect, the Contractor shall be barred from asserting any claim for compensation, expense or damages with respect to such delay.

§ 8.3.4 No claim for delay shall be allowed on account of failure of the Architect to furnish Drawings, Specifications or instructions, or to return Shop Drawings or Samples until a reasonable period of time (but in any event not less than fifteen days or such longer period as may be agreed to among the Architect, the Contractor and the Owner) after receipt by the Architect of written demand for such instructions, Drawings, or Samples, and not then unless the Contractor shows that the Architect's delay has materially interfered with the progress of the Work.

§ 8.3.5 Notwithstanding anything to the contrary in any of the Contract Documents, the Contractor acknowledges and agrees that no extension of time shall be granted on account of weather conditions except as provided for in this Section 8.3.5. A Claim by the Contractor for an increase in the Contract Time on account of weather shall only be granted if all the following conditions are met: (1) the weather during any calendar month (or pro rata portions of partial months at the beginning and end of the Contract Time) is "abnormal," as defined below; (2) the Contractor demonstrates that such abnormal weather had the effect of delaying completion of components of Work on the critical path indicated in the Construction Schedule; and (3) such Claim is made by written notice. "Abnormal weather" shall, for purposes of this Section, be limited to circumstances in which adverse weather conditions significantly exceed those which have historically been encountered, or may reasonably be expected to be encountered, at the Project site.

§ 8.3.6 If any of events described in this Section 8.3 of the General Conditions of the Contract entitle the Contractor to an extension of the Contract Time, the sole remedy of the Contractor shall be such extension of the Contract Time and the Contractor shall not be entitled to any adjustment of the Contract Sum, except as otherwise provided in the following sentence. If and to the extent that the Contract Time is extended by more than ten (10) business days solely on account of fault or neglect of the Owner or Architect, the Contract Sum shall be increased by the Contractor's reasonable and verified additional direct and indirect costs of performing the Work to the extent directly and solely attributable to extensions of the Contract Time on account of the fault or neglect of the Owner or Architect in excess of ten (10) business days.

§ 8.3.8 The Owner and Contractor agree that it is the intent of the Contract Documents that the Contractor shall have responsibility to achieve substantial completion of the Work within the Contract Time with an adequate work force, irrespective of any labor dispute (other than those of general applicability not directed at the Project, the Contractor or anyone for whom the Contractor is responsible), including picketing at or near the Project site, whether or not the Contractor is the primary employer involved in the labor dispute or a neutral employer, and whether or not the Contractor has a collective bargaining relationship with the union(s) involved in the labor dispute. Notwithstanding anything to the contrary in any of the Contract Documents, the Contractor acknowledges and agrees that no extension of time shall be granted on account of a labor dispute (other than those of general applicability not directed at the Project, the Contractor, or anyone for whom the contractor is responsible).

§ 8.3.8 If the Contractor submits a progress report indicating, or otherwise expresses an intention to achieve, completion of the Work prior to any completion date required by the Contract Documents or expiration of the Contract Time, no liability of the Owner to the Contractor for any failure of the Contractor to so complete the Work shall be created or implied.
ARTICLE 9  PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM
The Contract Sum is stated in the Agreement and, including authorized adjustments, is the maximum amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents. The Contractor shall provide to the Owner, throughout the course of the Work, reports projecting the cash flow needs of the Contractor. This report shall be prepared and delivered monthly, projecting the anticipated needs for the balance of the Project.

§ 9.2 SCHEDULE OF VALUES
Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Owner and 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 in such form and supported by such data to substantiate its accuracy as the Architect may require and shall be revised if later found by the Architect to be inaccurate. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor’s Applications for Payment. Each item in the schedule of values shall be exclusive of the Contractor’s Fee. The proper share of the Contractor’s Fee for each item shall be listed in a separate line or column.

§ 9.3 APPLICATIONS FOR PAYMENT
§ 9.3.1 At the time or times established in the Agreement 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. The format and number of copies of such Applications for Payment shall be as directed by the Owner. 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. Each Application for Payment shall be accompanied by the following, all in form and substance satisfactory to the Owner: (i) a current Contractor’s lien waiver and duly executed and acknowledged sworn statement showing all Subcontractors and material suppliers with whom the Contractor has entered into subcontracts, the amount of each such subcontract, the amount requested for any Subcontractor and material supplier in the requested progress payment, together with similar sworn statements from all such Subcontractors and material suppliers; (ii) duly executed waivers of mechanics’ and material suppliers’ liens from all Subcontractors and, when appropriate, from material suppliers and lower tier Subcontractors establishing payment or satisfaction of payment of all amounts requested by the Contractor on behalf of such entities or persons in any previous Application for Payment; (iii) proof of compliance with insurance and surety provisions as outlined in this Agreement; (iv) an updated Schedule that accurately reflects the current status of the Project; and (v) all information and materials required to comply with the requirements of the Contract Documents or reasonably requested by the Owner or the Architect.

§ 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 when such Construction Change Directives have set forth an adjustment to the Contract Sum.

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

§ 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 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 Contractor shall maintain record drawings as required by the Contract Documents, including for the mechanical and electrical trades, and shall review and inspect such drawings on a monthly basis. Contractor shall, on a monthly basis provide to Owner written confirmation that the record drawings are current.

§ 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. 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:

1. defective Work not remedied;
2. third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by Contractor, including subcontractor and/or supplier lien claims which have not been dissolved by bond by operation of law by the Contractor;
3. failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
4. reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
5. damage to the Owner or a separate contractor;
6. 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;
7. repeated failure to carry out the Work in accordance with the Contract Documents;
8. failure to maintain current record drawings.
§ 9.3.2 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.

§ 9.6 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 Intentionally omitted.

§ 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, sub-subcontractor, or vendor.

§ 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 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.

§ 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.

§ 9.7 FAILURE OF PAYMENT
If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within fourteen (14) days after receipt of the Contractor’s Application for Payment, or if the Owner does not pay the Contractor within fourteen (14) days after the date established in the Contract Documents the amount certified by the Architect, then the Contractor may, upon fourteen (14) 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 reasonable costs of shutdown, delay and startup, 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 its intended use and only minor items which can be corrected or completed without any material interference with the Owner’s use of the Work which remains to be corrected or completed. Further, the following items are required from the Contractor prior to the Owner’s issuing of the Certificate of Substantial Completion: (i)
the Owner and Architect agree that the Project is ready for the use intended without any concurrent Work that will disrupt the Owner's activities; (ii) the Owner and the Architect agree that the Work has been completed in accordance with the Contract Documents, specifications, plans, drawings and all Change Orders; (iii) all HVAC systems included in the Work are functioning in accordance with the Contract Documents and a satisfactory test and balance report for said systems has been received by the Architect; (iv) all life safety systems included in the Work are functioning in accordance with the Contract Documents; (v) receipt by the Architect of the list of all outstanding Work that shall become the Punch List; and (vi) receipt by the Owner of all required final certifications and/or approvals from the governmental authorities having jurisdiction over the Work.

§ 9.8.2 Intentionally omitted.

§ 9.8.3 Upon receipt of the Contractor's 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, 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 retention applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 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. Such partial occupancy or use may begin whether or not the portion is substantially complete, provided the respective responsibilities of Owner and Contractor for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have been established in writing and approval by municipal authorities, if applicable, is granted. 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 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, (5) waivers of liens, in the form provided by the Owner, from the Contractor and all Subcontractors and suppliers who performed portions of the Work or supplied materials or equipment in connection with the Work, (6) the expiration of time within which any Contractor, Subcontractor or supplier could file a lien under law, (7) 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, (8) to the extent that final certificates(s) of occupancy for the Project and the certificates of inspection and operating permits described in Section 13.5.4 are required by governmental authorities to use and occupy the Project as intended, and to the extent that such items were not delivered to the Owner as a condition to Substantial completion of the Work, the final certificate(s) of occupancy for the Project and the certificates of inspection and operating permits described in Section 13.5.4, (9) the As-Built Documents and reproducible transparencies thereof, in accordance with Section 3.11, (10) all special warranties required by the Contract Documents, endorsed by the Contractor and in a form reasonably acceptable to the Architect and the Owner, and (11) all manufacturers' catalogs, instructions, and other similar data, including the necessary graphic cuts, diagrams, value charts, and the like, covering all mechanical and manually operated devices furnished and/or installed in any permanent structure. All of the foregoing items shall be submitted to the Owner in a single binder (the "Project Binder"), and the Contractor shall submit to the Owner four (4) copies of the Project Binder. As an additional condition to be satisfied prior to final payment, the Contractor's personnel or Subcontractors' personnel or suppliers' personnel, as appropriate, shall provide the property management and operations personnel at the Property with training in the operation and maintenance of building systems and controls installed as part of the Work. 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. 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.

§ 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.
.4 any Claim which has not been waived in accordance with this Agreement shall be deemed to have accrued upon discovery by the Owner of the condition or breach upon which such Claim is based, for the purpose of any applicable statute of limitation.

§ 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 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 responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 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 out 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 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  The Contractor shall provide and maintain in good operating condition suitable and adequate fire protection equipment and services, and shall comply with all reasonable recommendations regarding fire protection made by the representatives of the fire insurance company carrying insurance on the Work or by the local fire chief or fire marshal. The area within the site limits, including all storage areas, shall be kept orderly and clean, and all combustible rubbish shall be promptly removed from the site.

§ 10.2.9  The Contractor is responsible for maintaining the area within the site limits free of all debris and food-related trash that may harbor and/or attract rodents. The Contractor shall provide secure refuse containers for all food-related trash. The containers shall be heavy-duty refuse containers with tight-fitting domed lids, with a spring loaded flap, and no opening that allow access by rodents. The Contractor shall notify the Owner immediately whenever rodents or signs of rodents (e.g., burrows, droppings) are observed.
§ 10.2.10 The Contractor shall at all times protect excavations, trenches, buildings and materials, from rain water, ground water, backup or leakage of sewers, drains and other piping, and from water of any other origin and shall remove promptly any accumulation of water. The Contractor shall provide and operate all pumps, piping and other equipment necessary to this end.

§ 10.2.11 The Contractor shall take reasonable precautions to prevent loss or damage caused by vandalism, theft, burglary, pilferage or unexplained disappearance of property of the Owner, whether or not forming part of the Work, located within those areas of the Project to which the Contractor has control.

§ 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 31 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 and normal and/or customary construction practices 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 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.

§ 10.3.3 Owner agrees to 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 reasonable attorneys' fees arising out of or resulting from the Work in the affected area if: i) 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; and ii) owner knowingly failed to disclose the presence of such material or substance; and iii) that such claim, damage, loss or expense is attributable to bodily injury, sickness, death, or injury to or destruction of tangible property (other than the Work itself) is found to be caused by the presence of such material or substance and 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.

§ 10.3.4.1 Hazardous waste that is generated by the Contractor as part of the Work shall be stored and disposed of in accordance with all applicable Federal, State and local regulations. Hazardous waste storage requirements include, but are not limited to, secondary containment, proper labeling, segregation of incompatible materials and routing.
inspection of storage areas. In addition, all hazardous waste containers shall be constructed of a material that is compatible with the waste, shall be in sound condition, and shall be kept securely closed at all times.

§ 10.3.4.2 The Contractor is responsible for the proper removal and disposition of all surplus chemicals (e.g., paints, lubricants, cleaning products) that they bring on-site as part of the Work. The Contractor shall not use any drain, pipe or plumbing fixture for the disposal of any waste materials. No chemicals that the Contractor brings on-site shall remain on the Project site at the completion of the Work.

§ 10.3.4.3 To ensure that construction activities and the use of heavy equipment does not increase the risk of release of oil or hazardous materials to the environment, the Contractor shall have and implement a Spill Plan that reflects all regulatory standards. The Contractor shall immediately report all spills/releases to the Owner. The Contractor shall coordinate with the Owner regarding reporting and follow-up documentation to outside regulatory agencies.

§ 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 outside the scope of its Work 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.

§ 10.3.7 Notwithstanding anything to the contrary, the Contractor acknowledges and agrees that the Work will likely require the removal and/or remediation of soil, debris and other items containing hazardous materials or contaminants to the extent disclosed in reports or materials previously delivered to the Contractor. All such Work shall be performed, and all such materials shall be removed and disposed of, by qualified and licensed (where required) parties engaged by the Contractor in compliance with all applicable legal requirements.

§ 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 shall purchase from and maintain in a company or companies acceptable to Owner and lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims which may arise out of or result from the Contractor’s operations and completed operations under the Contract and for which the Contractor 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. Such insurance shall include, at a minimum, the following:

§ 11.1.1.1
The Contractor shall maintain the insurance coverages set out in this Section, insuring the Contractor and its employees, agents, and designees, which insurance shall be by policies that are subject to the Owner’s approval:

a. Workers’ Compensation Insurance to cover full liability under the Workers’ Compensation laws of the state or jurisdiction in which the Project is located at the statutory limits required in said jurisdiction, including coverage for the benefits provided under United States Longshoremen’s & Harbor Workers’ Act, if applicable.

b. Employers’ Liability Insurance (with limits of not less than $500,000 per accident for Bodily Injury by accident, $500,000 each employee - by disease and $50,000 policy limit - by disease), covering operations of the Contractor.
c. Commercial General Liability ("CGL") Insurance for operations of the Contractor with coverage written at least as broad as that of the standard Commercial General Liability Insurance policy (Occurrence Form) including hazards of operations (including explosions, collapse, and underground operations), with contractual liability coverage and personal injury liability coverage for claims arising out of this Agreement. The insurance required by this subsection (c) shall be written for not less than limits of liability as follows: $1,000,000 each occurrence for bodily injury and property damage; $2,000,000 general aggregate; and $2,000,000 aggregate products/completed operations. CGL coverage shall be written on ISO Occurrence Form CG 10 01 (10 01) or a substitute form providing equivalent coverage and shall cover liability arising from premises, operations, independent contractors, products, completed operations, and personal and advertising injury.

d. Automobile Liability Insurance covering all owned, non-owned and hired automobiles, trucks, and trailers of the Contractor. Such insurance coverage shall be written at least as broad as that of the Standard Commercial Automobile Liability policy and shall be written for not less than a $1,000,000 limit of liability per occurrence for bodily injury and property damage.

e. Should aircraft or watercraft of any kind be used by Contractor, any tier of Subcontractor or by anyone else on their behalf, Contractor or Subcontractor shall maintain or cause the operator of the aircraft/watercraft to maintain Aircraft/Watercraft Public Liability Insurance including bodily injury, property damage, and passenger liability, with respect to any aircraft/watercraft owner, used, operated or hired in connection with the Work by the Contractor, Subcontractor or anyone else written for not less than a $5,000,000 limit of liability per occurrence for bodily injury and property damage.

f. Should the performance of this Agreement require the Contractor, any tier of subcontractor or anyone else on their behalf to conduct any activities in the vicinity of a railroad, the Contractor or Subcontractor shall maintain such Railroad Protective Insurance as may be required by the affected railroad written for not less than the limits required by such railroad. The Contractor's Railroad Protective Insurance shall be written on the policy form required by the affected railroad.

g. Excess or Umbrella Liability Insurance with coverage written at least as broad as those of the primary policies required by this Subsections (b), (c), (d) and (e) above and written for not less than a $10,000,000 limit of liability per occurrence.

§ 11.1.1.2 Each insurance policy to be maintained under the prior Section, subparts (b), (c), (d), (e), (f), and (g), shall be endorsed to name as Additional Insureds: the Owner, Owner's Representative, Architect and the trustees, directors, officers, agents, consultants, servants and employees of each of them and all other interests as may be reasonably required by the Owner. Such parties shall be included as Additional Insureds on the CGL and Umbrella using ISO Additional Insured Endorsement CG 10 10 (11 15) or CG 20 33 (10 01) AND CG 20 37 (10 01) or an endorsement providing equivalent coverage to the additional insureds. This insurance for the Additional Insureds shall be as broad as the coverage provided for the named insured. Such insurance shall apply as primary and non-contributing insurance before any other insurance or self-insurance, including any deductible, maintained by, or provided to the, Additional Insured. If the Additional Insureds have other insurance which is applicable to the loss, such other insurance shall be on an excess or contingent basis and apply to the Additional Insureds only. The amount of Contractor's insurance shall not be reduced by the existence of such other insurance. All Subcontractors shall provide endorsements naming the Contractor, the Owner, Owner's Representative, Architect, and any lenders of Owner and all other parties required by this Agreement as "Additional Insureds" on their CGL and Umbrella policies using the same ISO forms or combinations of forms. Contractor and all Subcontractors shall maintain CGL and Umbrella coverage for themselves and all additional insureds for the duration of the Work and maintain Completed Operations coverage for themselves and the Additional Insureds for at least one (1) year after Substantial Completion of the Work.

§ 11.1.1.3 Prior to the date on which Contractor commences the performance of the Work, the Contractor shall cause to be furnished to the Owner the Certificate of Insurance for the coverages required by this Agreement to be maintained by Contractor with insurance carriers acceptable to the Owner. As and when the Owner may direct, copies of the actual insurance policies or renewals or replacements thereof shall be submitted to the Owner. All copies of policies, if any, and Certificates of Insurance submitted to the Owner shall be in form and content acceptable to the Owner. In the event Contractor maintains insurance with limits exceeding the limits required
hereunder, the Certificate of Insurance shall state the full extent of the coverage available to the above Additional Insureds. Such excess liability coverage will inure to the benefit of the Additional Insureds in the event of loss in excess of the minimum insurance required herein. Contractor will obtain and maintain copies of Certificates of Insurance from all Subcontractors.

§ 11.1.1.4 Contractor shall require all policies of insurance that are secured and maintained by Contractor to include clauses providing that each carrier shall waive all of its rights of recovery, under subrogation or otherwise, against the Owner, Owner's Representative, Architect and their affiliates. In addition, Contractor waives all rights of recovery against the Owner, Owner's Representative and/or Architect it may have or acquire because of deductible clauses in or inadequacy of limits of any policies of insurance that are in any way related to the Work or activities of Contractor. Nothing contained herein shall relieve contractor from its obligations to exercise due care in the performance of its duties under this Contract. If the Contractor fails to furnish and maintain the required insurance, the Owner may, at its option, purchase such insurance on behalf of the Contractor, and Contractor shall pay the cost thereof to the Owner upon demand and shall furnish to the Owner any information needed to obtain such insurance.

§ 11.1.2 Intentionally omitted.

§ 11.1.3 Certificates of insurance acceptable to the Owner 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 with reasonable promptness. These certificates shall set forth evidence of all coverage required by Section 11.1.1. The form of certificates shall be the ACCORD form. Contractor shall furnish to the Owner copies of any endorsements that are subsequently issued amending limits of coverage.

§ 11.1.4 Intentionally omitted.

§ 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 Owner 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 Builders Risk Property insurance shall be provided by the Owner and be 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 Architect's and Contractor's services and expenses required as a result of such insured loss. The Owner's property insurance will not cover hoists, tools, or other equipment belonging to the Contractor or any Subcontractor.
§ 11.3.2 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.

§ 11.3.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles unless such loss is due to the fault or neglect of Contractor or a party for whom Contractor is responsible.

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

§ 11.3.5 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 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. 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 to the extent covered by insurance.

§ 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 Intentionally omitted.

§ 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
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 proceed 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.

§ 11.3.8 A loss insured under the Owner’s property insurance shall be adjusted by the Owner in good faith and made payable to the Owner 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 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 Intentionally omitted.

§ 11.3.10 The Owner 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 Owner shall have the right to require the Contractor to furnish 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 cost of all bonds shall be included in the Construction Manager’s Fee. If the construction manager requires bonding of subcontractors, this cost shall be noted as a separate cost item on the subcontractors’ bid and contract. The owner shall have the right to reject the bond cost for subcontractors as a cost of the work and require the construction manager to carry the cost as part of the base fee.

§ 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.

§ 11.5.1.1 In addition, should anyone claiming by, through or under Contractor assert a mechanic’s lien on the Project alleging non-payment for work, labor and materials or other similar claims regarding the Project, Contractor shall be obligated to obtain a bond pursuant to applicable law, or if acceptable to Owner, other lawful and satisfactory security, to discharge said lien and to clear the title of the Project.

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 Architect’s request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the 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 Architect has not specifically requested to examine prior to its being covered, the 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, and any cost, expenses, loss or damages to the Owner resulting from such failure or defect, 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 a written acceptance of such 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. This obligation under the Section 12.2.2 shall survive acceptance of the Work under the Contract and termination of the Contract.

§ 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. This obligation under this Section 12.2.2 shall survive acceptance of the Work under the Contract and termination of the Contract.

§ 12.2.2.3 Intentionally omitted.
§ 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 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.

§ 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 so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable, but in such event, the Owner’s acceptance shall not be deemed a waiver of any other rights the Owner has hereunder. 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 place where the Project is located.

§ 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. 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, provided, however, that either party may assign this Agreement or any rights acquired hereunder without the other party’s consent if such assignment is to any corporation or entity which may hereafter become the party’s successor-in-interest or which purchases all or substantially all of the party’s assets. In the event an assignment is approved, the assignee must expressly assume all obligations and liabilities of the assignor hereunder, and such assignment will not relieve the assignor of its obligations hereunder. Any attempt at assignment without the consent of the other party as provided herein shall be deemed null and void and a material breach of this Agreement. 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.
§ 13.2.2 Notwithstanding the foregoing, 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.

§ 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 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 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.
§ 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. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

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; or
.4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor’s request, reasonable evidence as required by Section 2.2.1.

§ 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.

§ 14.1.4 If the Work is stopped for a period of 60 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
§ 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 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 subcontracts pursuant to Section 5.4; and

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Contractor shall first provide initial notice of a delay within 3 days of the event giving rise to the delay, and then provide a Claim within such 21 day period thereafter; and further provided, however, that the Contractor shall use its best efforts to furnish the Architect and the Owner, as expeditiously as possible, with notice of any Claim including, without limitation, those in connection with concealed or unknown conditions, once such Claim is recognized, and shall cooperate with the Architect and the Owner in an effort to mitigate the alleged or potential damages, delay or other adverse consequences arising out of the condition which is the cause of such a Claim. THE CONTRACTOR EXPRESSLY AGREES THAT FAILURE OF THE CONTRACTOR TO INITIATE A CLAIM WITHIN THE TIME LIMITS SPECIFIED IN THIS SECTION 15.1.2 SHALL RESULT IN SUCH CLAIM BEING WAIVED.

§ 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 that are not in dispute 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 in Section 15.1.2 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 Contractor shall advise the Owner and Architect in writing of any known delay within three (3) days of its knowledge of the same (including delays in the receipt of drawings or designs from designer or Architect), and shall include an identification of the delay, its anticipated duration and its anticipated effect on the prosecution and completion of the Work. If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided in Section 15.1.2 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. The Contractor shall have the burden of demonstrating the effect of the claimed delay on the Contract Time, and shall furnish the Owner and Architect with such documentation relating thereto as they may reasonably require. The Contractor shall take all prudent steps necessary to minimize the delay, and shall diligently proceed to complete the Work as required by the Contract Documents. Notwithstanding the foregoing, time for performance of a party's obligations hereunder shall not be tolled unless and until the party claiming such excuse has provided the other party with written notice of the event.

§ 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. Claims arising from adverse weather conditions shall be subject to the provisions of Section 8.3.5.

§ 15.1.6 Intentionally omitted.

§ 15.1.7 No extension of time shall be granted to the Contractor for delays occurring to parts of the Work that have no measurable impact on the completion of the Milestone Dates; nor shall any extension of time be granted for delays to parts of the Work that are not located on the critical path. The Contractor acknowledges and agrees that an excusable delay in a portion of the Work or schedule activity does not necessarily result in a delay of equal duration in the completion of the entire Project.

§ 15.1.8 Direct Negotiation. Any dispute arising at any time during or after the construction of the Project shall be resolved. If possible, by negotiations between duly authorized representatives of the Contractor and the Owner. If such duly authorized representatives are unable to resolve any dispute within ten (10) days after written notice of such dispute together with all relevant supporting documentation is given by either party to the other, the matter may be submitted by either party to the dispute resolution process set forth below.

§ 15.2 INITIAL DECISION
§ 15.2.1 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 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 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.

§ 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.

§ 15.2.8.1 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.

§ 15.2.7 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.

§ 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 a civil action but, in such event, mediation shall proceed in advance of such civil action, 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.

§ 18.3.3 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 LITIGATION AND ARBITRATION
§ 15.4.1 Any dispute that is not resolved by negotiation or mediation or arbitration shall be resolved by litigation in state or federal court. Contractor asserts jurisdiction in the state or federal courts of New Hampshire and agrees that the sole venue of any litigation between Contractor and Owner shall be Hillsborough County, New Hampshire. To the extent, the parties have agreed in the Owner-Contractor Agreement that claims below a certain dollar threshold shall be decided by binding arbitration, such arbitration shall be conducted and the arbitrator(s) selected in accordance with the Construction Industry Rules of the American Arbitration Association then pertaining unless the parties mutually agree otherwise.
DRAWINGS AND SPECIFICATIONS LIST

DRAWINGS
A0-3 ADA, CONVERSIONS, SYMBOLS, SIGNAGE, ABBREVIATIONS
A0-4 CODE REVIEW
A0-5 PARTITION TYPES
A1-1 DEMOLITION PLAN
A1-2 FLOOR PLAN
A1-3 FURNITURE AND EQUIPMENT PLAN
A1-4 REFLECTED CEILING PLAN
A2-1 FINISH, DOOR, WINDOW SCHEDULES
A3-1 DEMOLITION EXTERIOR ELEVATIONS
A3-2 EXTERIOR ELEVATIONS
A5-1 DETAILS
A6-1 INTERIOR ELEVATIONS
A6-2 INTERIOR ELEVATIONS
A6-3 INTERIOR ELEVATIONS

MD1-1 HVAC DEMOLITION PLAN
M1-1 HVAC PIPING PLAN
M1-2 HVAC DUCT WORK PLAN
M6-1 HVAC SCHEDULE

PD1-1 PLUMBING DEMO PLAN
P1-1 PLUMBING PLAN
FP1-1 FIRE PROTECTION

ED1-1 ELECTRICAL DEMO PLAN
E0-1 ELECTRICAL NOTES LEGENDS
E1-1 LIGHTING PLAN
E1-2 POWER PLAN
E4-1 ELECTRICAL DETAILS
E5-1 ELECTRICAL SCHEDULES

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00 2113 - Instructions to Bidders
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01 2000 - Price and Payment Procedures
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01 2300 - Alternates
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01 3216 - Construction Progress Schedule
01 4000 - Quality Requirements
01 4533 - Code-Required Special Inspections
01 5000 - Temporary Facilities and Controls
01 5100 - Temporary Utilities
01 5213 - Field Offices and Sheds
01 5721 - Indoor Air Quality Controls
01 6000 - Product Requirements
01 6116 - Volatile Organic Compound (VOC) Content Restrictions
01 7000 - Execution and Closeout Requirements
01 7419 - Construction Waste Management and Disposal
01 7800 - Closeout Submittals

DIVISION 02 -- EXISTING CONDITIONS
02 4100 - Demolition

DIVISION 04 -- MASONRY
04 2000 - Unit Masonry

DIVISION 06 -- WOOD, PLASTICS, AND COMPOSITES
A. 06 1000 - Rough Carpentry

DIVISION 07 -- THERMAL AND MOISTURE PROTECTION
07 2400 - Exterior Insulation and Finish Systems
07 6200 - Sheet Metal Flashing and Trim
07 7100 - Roof Specialties
07 8400 - Firestopping
07 9005 - Joint Sealers

DIVISION 08 -- OPENINGS
08 1113 - Hollow Metal Doors and Frames
08 1416 - Flush Wood Doors
08 7100 - Door Hardware
08 8000 - Glazing

DIVISION 09 -- FINIShes
09 2116 - Gypsum Board Assemblies
09 5100 - Acoustical Ceilings
09 6500 - Resilient Flooring
09 6813 - Tile Carpeting
09 9000 - Painting and Coating

**DIVISION 10 -- SPECIALTIES**
10 4400 - Fire Protection Specialties

**DIVISION 22 - PLUMBING**

22 00 00 Plumbing
22 01 00 Operation and Maintenance of Plumbing
22 05 00 Common Work Results for Plumbing
22 05 23 General-Duty Valves for Plumbing Piping
22 05 29 Hangers and Supports for Plumbing Piping and Equipment
22 05 53 Identification for Plumbing Piping and Equipment
22 06 10 Schedules for Plumbing Piping and Pumps
22 07 00 Plumbing Insulation
22 11 00 Facility Water Distribution
22 13 00 Facility Sanitary Sewerage
22 14 00 Facility Storm Drainage

**DIVISION 23 - HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)**

23 00 00 Heating, Ventilating, and Air-Conditioning (HVAC)
23 01 00 Operation and Maintenance of HVAC Systems
23 05 00 Common Work Results for HVAC
23 05 16 Expansion Fittings and Loops for HVAC Piping
23 05 23 General-Duty Valves for HVAC Piping
23 05 29 Hangers and Supports for HVAC Piping and Equipment
23 05 53 Identification for HVAC Piping and Equipment
23 05 93 Testing, Adjusting, and Balancing for HVAC
23 06 20 Schedules for HVAC Piping
23 07 00 Pipe Insulation
23 07 13 Duct Insulation
23 09 00 Instrumentation and Control for HVAC
23 20 00 HVAC Piping and Specialties
23 23 00 Refrigerant Piping
23 31 00 HVAC Ducts and Accessories
23 37 00 Air Outlets and Inlets
23 74 00 Split-System Air-Conditioning Unit

**DIVISION 26 – ELECTRICAL**

26 00 00 Electrical
26 05 19 Low-Voltage Electrical Power Conductors and Cables
26 05 26 Grounding and Bonding for Electrical Systems
26 05 29 Hangers and Supports for Electrical Systems
26 05 33 Raceways and Boxes for Electrical Systems
26 05 48 Vibration and Seismic Controls for Electrical Systems
26 05 53 Identification for Electrical Systems
26 09 23 Lighting Control Devices
26 24 16 Panelboards
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A. 06 1000 - Rough Carpentry

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07 2400 - Exterior Insulation and Finish Systems
07 6200 - Sheet Metal Flashing and Trim
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07 8400 - Firestopping
07 9005 - Joint Sealers

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08 7100 - Door Hardware
08 8000 - Glazing

DIVISION 09 -- FINISHES
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09 5100 - Acoustical Ceilings
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26 05 53 Identification for Electrical Systems
26 09 23 Lighting Control Devices
26 24 16 Panelboards
26 27 26 Wiring Devices
26 28 16 Enclosed Switches and Circuit Breakers
26 51 00 Interior Lighting
PART 1 GENERAL

1.01 PROJECT IDENTIFICATION
A. Project Name: MCC CAFETERIA/CLASSROOM RENOVATION, located at 1066 Front St, Manchester, NH.
B. Project Number: 3043.
C. The Owner, hereinafter referred to as Owner: Manchester Community College c/o Sarah Diversi, CFO.

1.02 NOTICE TO PROSPECTIVE BIDDERS
A. These documents constitute an Invitation to Bid to General Contractors for the construction of the project described below.

1.03 PROJECT DESCRIPTION
A. Summary Project Description: Minor Renovations and MEP work to the existing recently converted to a temporary cafeteria. The new space is four classrooms and ancillary offices and support rooms.
B. Contract Scope: Construction, demolition, and renovation.

1.04 PROJECT CONSULTANTS
A. The Architect, hereinafter referred to as Architect: Warrenstreet Architects, Inc.
   1. Address: 27 Warren St.
   2. City, State, Zip: Concord, NH 03301.

1.05 PROCUREMENT TIMETABLE
A. Pre-Bid Briefing: Wednesday May 8, 2013 at 3:00 PM.
B. Last Request for Substitution Due: 7 days prior to due date of bids.
C. Last Request for Information Due: 7 days prior to due date of bids.
D. Anticipated Bid Due Date: Friday May 17, 2013, before 3:00 PM local time.
E. Bid Opening: Same day, 3:00 PM local time.
F. Notice to Proceed: Within 7 days after due date.
G. Bids May Not Be Withdrawn Until: 30 days after due date.
I. The Owner reserves the right to change the schedule or terminate the entire procurement process at any time.

1.06 PROCUREMENT DOCUMENTS
A. Availability of Documents: Complete sets of procurement documents may be obtained:
   1. From Owner at the MCC Website: http://www.ccsnh.edu/open-bids
B. Documents are on display at the offices of the following construction plan rooms:
   1. Signature Press and Blueprinting, Inc., 45 Londonderry Turnpike, Rte. 28 Bypass, Hooksett, NH 03106;
2. Reed Construction Data, 30 Technology Parkway South Suite 100 Norcross GA., 30092
3. Construction Summary of NH: Inc., 734 Chestnut Street, Manchester, NH 03104;
4. Infinite Imaging: 933 Islington Street, Portsmouth, NH 03801
5. McGraw-Hill Construction, Dodge Plan Room: 880 Second Street, Manchester, NH 03102;
6. Minuteman Press: 109 Gosling Road, Newington, NH 03801;
7. Works in Progress, 20 Farrell Street, Suite 103, South Burlington, VT 05403
8. Signature Press and Blueprinting, Inc., 45 Londonderry Turnpike, Rte. 28 Bypass, Hooksett, NH 03106;
9. Reed Construction Data, 30 Technology Parkway South Suite 100 Norcross GA., 30092
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13. Minuteman Press: 109 Gosling Road, Newington, NH 03801;
14. Works in Progress, 20 Farrell Street, Suite 103, South Burlington, VT 05403

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION
SECTION 00 0110

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   G. 01 4000 - Quality Requirements
   H. 01 4533 - Code-Required Special Inspections
   I. 01 5000 - Temporary Facilities and Controls
   J. 01 5100 - Temporary Utilities
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   M. 01 6000 - Product Requirements
   N. 01 6116 - Volatile Organic Compound (VOC) Content Restrictions
   O. 01 7000 - Execution and Closeout Requirements
   P. 01 7419 - Construction Waste Management and Disposal
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   A. 02 4100 - Demolition

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   A. 04 2000 - Unit Masonry

2.04 Division 06 -- Wood, Plastics, and Composites
   A. 06 1000 - Rough Carpentry

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2.07 Division 09 -- Finishes
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   B. 09 5100 - Acoustical Ceilings
   C. 09 6500 - Resilient Flooring
   D. 09 6813 - Tile Carpeting
   E. 09 9000 - Painting and Coating

2.08 Division 10 -- Specialties
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INSTRUCTIONS TO BIDDERS

SUMMARY

1.01 DOCUMENT INCLUDES

A. Invitation
   1. Bid Submission
   2. Intent
   3. Work Identified in the Contract Documents
   4. Contract Time

B. Bid Documents and Contract Documents
   1. Definitions
   2. Examination

C. Site Assessment
   1. Site Examination
   2. Prebid Conference

D. Qualifications
   1. Prequalification

E. Bid Submission
   1. Bid Depository
   2. Submission Procedure
   3. Bid Ineligibility

F. Bid Enclosures/Requirements
   1. Security Deposit
   2. Bid Form Requirements
   3. Bid Form Signature

G. Offer Acceptance/Rejection
   1. Duration of Offer
   2. Acceptance of Offer

INVITATION

2.01 BID SUBMISSION

A. Bids signed and under seal, executed, and dated will be received at the office of the Owner
   Manchester Community College. 1066 Front St, Manchester, NH, Office of the President before
   3 - three p.m. local standard time on the 17 - Seventeenth day of May 2013.

2.02 INTENT

A. The intent of this Bid request is to obtain an offer to perform work to complete a renovation
   located at the MCC Campus for a Stipulated Sum contract, in accordance with the Contract
   Documents.

2.03 WORK IDENTIFIED IN THE CONTRACT DOCUMENTS

A. Work of this proposed Contract comprises building construction, renovation, and demolition,
   including general construction, structural, mechanical, and electrical Work.

2.04 CONTRACT TIME

A. Owner requires that under the work of this contract be completed as quickly as possible and
consideration will be given to time of completion when reviewing the submitted bids, but no later than August 23, 2013.

BID DOCUMENTS AND CONTRACT DOCUMENTS

3.01 DEFINITIONS
A. Bid Documents: Contract Documents supplemented with AIA 201 General Conditions Supplements To Bid Forms and Appendices identified.

3.02 CONTRACT DOCUMENTS IDENTIFICATION
A. The Contract Documents are identified as Project Number MC13-17, as prepared by Architect who is located at 27 Warren St, Concord, NH 03301, and with contents as identified in the Table of Contents.

3.03 AVAILABILITY
A. Bid documents may be obtained at the establishments noted in the Invitation to Bid.

3.04 EXAMINATION
A. Bid Documents may be viewed at the office of Architect.
B. Bid Documents are on display at the offices of the following construction plan rooms:
   1. those establishments noted in the Invitation to Bid.
C. Upon receipt of Bid Documents verify that documents are complete. Notify Architect should the documents be incomplete.
D. Immediately notify Architect upon finding discrepancies or omissions in the Bid Documents.

3.05 INQUIRIES/ADDENDA
A. Addenda may be issued during the bidding period. All Addenda become part of the Contract Documents. Include resultant costs in the Bid Amount.
B. Verbal answers are not binding on any party.
C. Clarifications requested by bidders must be in writing not less than 7 days before date set for receipt of bids. The reply will be in the form of an Addendum, a copy of which will be posted on http://www.ccsnh.edu/open-bids.

3.06 PRODUCT/ASSEMBLY/SYSTEM SUBSTITUTIONS
A. Substitute products will be considered if submitted as an attachment to the Bid Form. Approval to submit substitutions prior to submission of bids is not required.
B. In submission of substitutions to products specified, bidders shall include in their bid all changes required in the Work and changes to Contract Time and Contract Sum to accommodate such substitutions. A later claim by the bidder for an addition to the Contract Time or Contract Sum because of changes in work necessitated by use of substitutions shall not be considered.
C. The submission shall provide sufficient information to determine acceptability of such products.
D. Provide complete information on required revisions to other work to accommodate each proposed substitution.
E. Provide products as specified unless substitutions are submitted in this manner and accepted.

SITE ASSESSMENT

4.01 SITE EXAMINATION
A. Examine the project site before submitting a bid.

B. A visit to the project site has been arranged for bidders as follows: on Wednesday May 8, 2013 at 3pm.

4.02 PREBID CONFERENCE

A. A bidders conference has been scheduled for 3 three p.m. on the 8 eighth day of May 2013 at the location of the project.

QUALIFICATIONS

5.01 EVIDENCE OF QUALIFICATIONS

A. To demonstrate previous experience and qualifications to provide the scope of work indicated on the contract documents, the bidder is required to complete the experience form as part of the bid package.

5.02 SUBCONTRACTORS/SUPPLIERS/OTHERS

A. Owner reserves the right to reject a proposed subcontractor for reasonable cause.

BID SUBMISSION

6.01 BID DEPOSITORY

6.02 SUBMISSION PROCEDURE

A. Bidders shall be solely responsible for the delivery of their bids in the manner and time prescribed.

B. Submit one copy of the executed offer on the Bid Forms provided, signed and sealed with the required security in a closed opaque envelope, clearly identified with bidder’s name, project name and Owner’s name on the outside.

6.03 REJECTION OF BID

A. The Chancellor reserves the right to reject any and all Bids, to waive technicalities or to advertise for new Bids. In his/her judgement, the best interest of the Community College System of NH will be promoted thereby. The Chancellor reserves the right to reject the Bid of a Bidder who is deemed not in the position to perform the Contract. Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind, may at the discretion of the Chancellor, be declared unacceptable.

B. Bid Forms, Appendices, and enclosures that are improperly prepared may, at the discretion of Chancellor, be declared unacceptable.

C. Failure to provide security deposit, bonding or insurance requirements may, at the discretion of Chancellor, be waived.

BID ENCLOSURES/REQUIREMENTS

7.01 PERFORMANCE ASSURANCE

A. Accepted Bidder: Provide a 100% Performance and Payment bond as described in Document 00 7300 - Supplementary Conditions.

7.02 INSURANCE

A. Provide an executed "Undertaking of Insurance" on a standard form provided by the insurance company stating their intention to provide insurance to the bidder in accordance with the insurance requirements of the Contract Documents - See CCSNH Insurance Requirements.
Attached.

B. NO OPERATIONS SHALL COMMENCE UNTIL CERTIFICATES OF INSURANCE ATTESTING TO THE FOLLOWING LIMITS HAVE BEEN FILED WITH THE CHANCELLOR, APPROVED BY THE COLLEGE AND A NOTICE TO PROCEED IS ISSUED.

9.01 BID FORM REQUIREMENTS
A. Complete all requested information in the Bid Form and Appendices.

9.02 FEES FOR CHANGES IN THE WORK
A. Include in the Bid Form, the overhead and profit fees on own Work and Work by subcontractors, applicable for Changes in the Work, whether additions to or deductions from the Work on which the Bid Amount is based.

9.03 BID FORM SIGNATURE
A. The Bid Form shall be signed by the bidder, as follows:
1. Sole Proprietorship: Signature of sole proprietor in the presence of a witness who will also sign. Insert the words "Sole Proprietor" under the signature. Affix seal.
2. Partnership: Signature of all partners in the presence of a witness who will also sign. Insert the word "Partner" under each signature. Affix seal to each signature.
3. Corporation: Signature of a duly authorized signing officer(s) in their normal signatures. Insert the officer's capacity in which the signing officer acts, under each signature. Affix the corporate seal. If the bid is signed by officials other than the president and secretary of the company, or the president/secretary/treasurer of the company, a copy of the by-law resolution of their board of directors authorizing them to do so, must also be submitted with the Bid Form in the bid envelope.
4. Joint Venture: Each party of the joint venture shall execute the Bid Form under their respective seals in a manner appropriate to such party as described above, similar to the requirements of a Partnership.

9.04 SELECTION AND AWARD OF ALTERNATIVES
A. Bids will be evaluated on the total of the base bid price and all of the alternatives. After determination of the successful bidder, consideration will be given to which alternatives will be included in the Work.

OFFER ACCEPTANCE/REJECTION

10.01 DURATION OF OFFER
A. Bids shall remain open to acceptance and shall be irrevocable for a period of thirty (30) days after the bid closing date.

10.02 ACCEPTANCE OF OFFER
A. Owner reserves the right to accept or reject any or all offers.

B. After acceptance by Owner, Architect on behalf of Owner, will issue to the successful bidder, a written Bid Acceptance.

END OF INSTRUCTIONS TO BIDDERS
SECTION 00 4000

PROCUREMENT FORMS AND SUPPLEMENTS

PART 1 GENERAL

1.01 Contractor is responsible for obtaining a valid license to use all copyrighted documents specified but not included in the Project Manual.

1.02 FORMS

A. Use the following forms for the specified purposes unless otherwise indicated elsewhere in the procurement requirements.

B. Bid Form: SECTION 00416.

1.03 REFERENCE STANDARDS

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION
SECTION 01 1000

SUMMARY

PART 1 GENERAL

1.01 PROJECT
   A. Project Name: MCC13-17 Manchester Community College Temporary Kitchen Classroom Renovations.
   B. Owner's Name: Manchester Community College.
   C. Architect's Name: Warrenstreet Architects, Inc.
   D. The Project consists of the alteration of a 4,760 sf renovation of existing automotive classroom/ temporary cafeteria into classrooms space.

1.02 CONTRACT DESCRIPTION
   A. Contract Type: A single prime contract based on a Stipulated Price as described in AIA 101.

1.03 DESCRIPTION OF ALTERATIONS WORK
   A. Scope of alterations work is shown on drawings.
   B. Plumbing: Alter existing system and add new construction, keeping existing in operation.
   C. HVAC: Alter existing system and add new construction, keeping existing in operation.
   D. Electrical Power and Lighting: Alter existing system and add new construction, keeping existing in operation. All work must be completed by August 23, 2013 acceptable for classes.
   E. Fire Suppression Sprinklers: Alter existing system and add new construction, keeping existing in operation.
   F. Fire Alarm: Alter existing system and add new construction, keeping existing in operation.

1.04 WORK BY OWNER
   A. Owner has awarded a contract for abatement of existing hazardous materials associated with the window replacements
   B. Kitchen Equipment shown within the existing building has been relocated to final locations by the owner.

1.05 OWNER OCCUPANCY
   A. Owner intends to continue to occupy adjacent portions of the existing building during the entire construction period.
   B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
   C. Schedule the Work to accommodate Owner occupancy.

1.06 CONTRACTOR USE OF SITE AND PREMISES
   A. Construction Operations: Limited to areas noted on Drawings.
   B. Arrange use of site and premises to allow for continued traffic to the north parking lot.
      1. Use of site and premises by the public.
   C. Provide access to and from site as required by law and by Owner:
      1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
2. Do not obstruct roadways, sidewalks, or other public ways without written approval of the Owner.

D. Time Restrictions:
1. Limit conduct of especially noisy exterior work to the hours of 8am to 5pm.

E. Utility Outages and Shutdown:
1. Limit disruption of utility services to hours the building is unoccupied.
2. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
3. Prevent accidental disruption of utility services to other facilities.

1.07 WORK SEQUENCE

A. Construct Work in stages during the construction period:
1. Stage 1: construct all interior fitup, LGMF and drywall, electrical and mechanical, replace all windows by August 14, 2013 ready for classroom fall occupancy.
2. Stage 2: Construct one or two "alternate" gable end parrapet walls.

B. Coordinate construction schedule and operations with Owner.

END OF SECTION
SECTION 01 2000

PRICE AND PAYMENT PROCEDURES

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Procedures for preparation and submittal of applications for progress payments.
B. Change procedures.

1.02  SCHEDULE OF VALUES

A. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
B. Forms filled out by hand will not be accepted.

1.03  APPLICATIONS FOR PROGRESS PAYMENTS

A. Payment Period: Submit at intervals stipulated in the Agreement.
B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
C. Forms filled out by hand will not be accepted.
D. Execute certification by signature of authorized officer.
E. Submit three copies of each Application for Payment.

1.04  MODIFICATION PROCEDURES

A. For minor changes not involving an adjustment to the Contract Price or Contract Time, Architect will issue instructions directly to Contractor.
B. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
   1. The document will describe the required changes and will designate method of determining any change in Contract Price or Contract Time.
   2. Promptly execute the change.
C. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within ____ days.
D. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
E. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

END OF SECTION
SECTION 01 2100

ALLOWANCES

PART 1  GENERAL

1.01 SECTION INCLUDES

A. Owner Allowance.
B. Inspecting and testing allowances.
C. Payment and modification procedures relating to allowances.

1.02 RELATED REQUIREMENTS

A. Section 01 2000 - Price and Payment Procedures: Additional payment and modification procedures.

1.03 OWNER ALLOWANCE

A. Contractor's costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from this Owner Allowance.
B. Funds will be drawn from the Owner Allowance only by Change Order.
C. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.04 INSPECTING AND TESTING ALLOWANCES

A. Costs Included in Inspecting and Testing Allowances: Cost of engaging an inspecting or testing agency; execution of inspecting and tests; and reporting results. GSI is under a term agreement with the CCSNH to provide these services which are to be coordinated by the Contractor.
B. Costs Not Included in the Inspecting and Testing Allowances:
   1. Costs of retesting upon failure of previous tests as determined by Architect.
C. Payment Procedures:
   1. Submit one copy of the inspecting or testing firm's invoice with next application for payment.

1.05 ALLOWANCES SCHEDULE

A. Unforeseen Conditions.
B. Construction Testing Services.
C. HVAC Testing, Adjusting, and Balancing Allowance: Include the sum of $2,500.00 for testing, adjusting, and balancing mechanical systems as specified in Section 23 0583.

PART 2  PRODUCTS - NOT USED

PART 3  EXECUTION - NOT USED

END OF SECTION
SECTION 01 2300

ALTERNATES

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Description of alternates.

1.02  RELATED REQUIREMENTS
A. Document 00 2113 - Instructions to Bidders: Instructions for preparation of pricing for alternatives.

1.03  ACCEPTANCE OF ALTERNATES
A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted alternates will be identified in the Owner-Contractor Agreement.

1.04  SCHEDULE OF ALTERNATES
A. Alternate No. One - Remove exterior oil containment tank, electrical, alarm, and venting up thru including patching the roof. The work shall inlcude all site work arequired including returning the site to its original state.
B. Alternate No. Two - Remove exterior gable end roof extention including rake and soffit complete to inside of the exterior masonry wall. Extend the masonry wall vertically up to a
C. Alternate No. Three - duplicate the effort of alternate two on the childcare building bumpout located 30 feet south of this project.

PART 2  PRODUCTS - NOT USED

PART 3  EXECUTION - NOT USED

END OF SECTION
SECTION 01 3000

ADMINISTRATIVE REQUIREMENTS

PART 1  GENERAL

1.01  SECTION INCLUDES
   A. Electronic document submittal service.
   B. Preconstruction meeting.
   C. Site mobilization meeting.
   D. Progress meetings.
   E. Construction progress schedule.
   F. Submittals for review, information, and project closeout.
   G. Submittal procedures.

1.02  RELATED REQUIREMENTS
   A. Document - A201 and as described in AIA101: Dates for applications for payment.
   B. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.
   C. Section 01 7800 - Closeout Submittals: Project record documents.

1.03  PROJECT COORDINATION
   A. Project Coordinator: Owner.
   B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for vehicular access, traffic, and parking facilities.
   C. During construction, coordinate use of site and facilities through the Project Coordinator.
   D. Comply with Project Coordinator’s procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
   E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities.
   F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
   G. Make the following types of submittals to Architect through the Project Coordinator:
      1. Requests for interpretation.
      2. Requests for substitution.
      3. Shop drawings, product data, and samples.
      4. Test and inspection reports.
      5. Manufacturer’s instructions and field reports.
      6. Applications for payment and change order requests.
      7. Progress schedules.
      8. Coordination drawings.

PART 2  PRODUCTS - NOT USED

PART 3  EXECUTION

3.01  PRECONSTRUCTION MEETING
3.01 MEETINGS FOLLOWING NOTICE OF AWARD

A. Owner will schedule a meeting after Notice of Award.

B. Attendance Required:
   1. Owner.
   3. Contractor.

C. Agenda:
   1. Execution of Owner-Contractor Agreement.
   2. Submission of executed bonds and insurance certificates.
   4. Submission of list of Subcontractors, list of Products, schedule of values, and progress schedule.
   5. Designation of personnel representing the parties to Contract, ________ and Architect.
   6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
   7. Scheduling.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.02 SITE MOBILIZATION MEETING

A. Architect will schedule a meeting at the Project site prior to Contractor occupancy.

B. Attendance Required:
   1. Contractor.
   2. Owner.
   3. Architect.
   4. Contractor’s Superintendent.
   5. Major Subcontractors.

C. Agenda:
   1. Use of premises by Owner and Contractor.
   2. Owner’s requirements and occupancy prior to completion.
   3. Construction facilities and controls provided by Owner.
   4. Temporary utilities provided by Owner.
   5. Survey and building layout.
   7. Schedules.
   8. Application for payment procedures.
   9. Procedures for testing.
   11. Requirements for start-up of equipment.
   12. Inspection and acceptance of equipment put into service during construction period.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at maximum bi-monthly intervals.

B. Attendance Required: Job superintendent, major Subcontractors and suppliers, Owner, Architect, as appropriate to agenda topics for each meeting.

C. Agenda:
   1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems that impede, or will impede, planned progress.
5. Review of submittals schedule and status of submittals.
6. Maintenance of progress schedule.
7. Corrective measures to regain projected schedules.
8. Planned progress during succeeding work period.
10. Effect of proposed changes on progress schedule and coordination.
11. Other business relating to Work.

D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.04 CONSTRUCTION PROGRESS SCHEDULE

A. If preliminary schedule requires revision after review, submit revised schedule within 10 days.

B. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
   1. Include written certification that major contractors have reviewed and accepted proposed schedule.

C. Within 10 days after joint review, submit complete schedule.

D. Submit updated schedule with each Application for Payment.

3.05 PROGRESS PHOTOGRAPHS

A. Submit photographs with each application for payment, taken not more than 3 days prior to submission of application for payment.

B. Photography Type: Digital; electronic files.

C. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
   1. Delivery Medium: Via email.
   2. File Naming: Include project identification, date and time of view, and view identification.
   3. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.
   4. Hard Copy: Printed hardcopy (grayscale) of PDF file and point of view sketch.

3.06 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
   1. Product data.
   2. Shop drawings.
   3. Samples for selection.
   4. Samples for verification.

B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed only for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - CLOSEOUT SUBMITTALS.

3.07 SUBMITTALS FOR INFORMATION
A. When the following are specified in individual sections, submit them for information:
   1. Design data.
   2. Certificates.
   3. Test reports.
   4. Inspection reports.
   5. Manufacturer’s instructions.
   6. Manufacturer’s field reports.
   7. Other types indicated.

B. Submit for Architect’s knowledge as contract administrator or for Owner. No action will be taken.

3.08 SUBMITTALS FOR PROJECT CLOSEOUT

A. When the following are specified in individual sections, submit them at project closeout:
   1. Project record documents.
   2. Operation and maintenance data.
   3. Warranties.
   5. Other types as indicated.

B. Submit for Owner’s benefit during and after project completion.

3.09 NUMBER OF COPIES OF SUBMITTALS

A. Documents for Review:
   1. Small Size Sheets, Not Larger Than 8-1/2 x 11 inches (215 x 280 mm): Submit the number of copies that Contractor requires, plus two copies that will be retained by Architect.

B. Documents for Information: Submit two copies.

C. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
   1. After review, produce duplicates.
   2. Retained samples will not be returned to Contractor unless specifically so stated.

3.10 SUBMITTAL PROCEDURES

A. Transmit each submittal with approved form.

B. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

C. Identify Project, Contractor, Subcontractor or supplier, pertinent drawing and detail number, and specification section number, as appropriate on each copy.

D. Apply Contractor’s stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.

E. Schedule submittals to expedite the Project, and coordinate submission of related items.

F. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.

G. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.

H. Provide space for Contractor and Architect review stamps.

I. When revised for resubmission, identify all changes made since previous submission.

J. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
K. Submittals not requested will not be recognized or processed.

END OF SECTION
SECTION 01 3216
CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Preliminary schedule.
   B. Construction progress schedule, bar chart type.

1.02 RELATED SECTIONS
   A. Section 01 1000 - Summary: Work sequence.

1.03 REFERENCES
   A. AGC (CPSM) - Construction Planning and Scheduling Manual; Associated General Contractors of America; 2004.

1.04 SUBMITTALS
   A. Within 10 days after date of Agreement, submit preliminary schedule defining planned operations for the first 60 days of Work, with a general outline for remainder of Work.
   B. Submit under transmittal letter form specified in Section 01 3000.

1.05 SCHEDULE FORMAT
   A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number.
   B. Diagram Sheet Size: Maximum 22 x 17 inches (560 x 432 mm) or width required.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PRELIMINARY SCHEDULE
   A. Prepare preliminary schedule in the form of a horizontal bar chart.

3.02 CONTENT
   A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
   B. Identify each item by specification section number.
   C. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
   D. Provide legend for symbols and abbreviations used.

3.03 BAR CHARTS
   A. Include a separate bar for each major portion of Work or operation.
   B. Identify the first work day of each week.

END OF SECTION
SECTION 01 4000
QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. References and standards.
B. Quality assurance submittals.
C. Control of installation.
D. Testing and inspection services.
E. Manufacturers' field services.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS


1.04 SUBMITTALS

A. Testing Agency Qualifications:
   1. Prior to start of Work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.

1.05 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
C. Obtain copies of standards where required by product specification sections.
D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.06 TESTING AND INSPECTION AGENCIES

A. Owner will employ services of an independent testing agency to perform certain specified testing; payment for cost of services will be derived from allowance specified in Section 01 2100; see Section 01 2100 and applicable sections for description of services included in allowance.
B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
PART 3 EXECUTION

2.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers’ instructions, including each step in sequence.

C. Should manufacturers’ instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

2.02 TESTING AND INSPECTION

A. Testing Agency Duties:
   2. Perform specified sampling and testing of products in accordance with specified standards.
   3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   4. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
   5. Perform additional tests and inspections required by Architect.
   6. Submit reports of all tests/inspections specified.

B. Limits on Testing/Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

C. Contractor Responsibilities:
   1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
   2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers’ facilities.
   3. Provide incidental labor and facilities:
      a. To provide access to Work to be tested/inspected.
      b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
      c. To facilitate tests/inspections.
      d. To provide storage and curing of test samples.
   4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
   5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
   6. Arrange with Owner’s agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
D. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.

E. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

2.03 MANUFACTURERS’ FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment and ________ as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers’ written instructions.

2.04 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

B. If, in the opinion of Architect, it is not practical to remove and replace the Work, Architect will direct an appropriate remedy or adjust payment.

END OF SECTION
SECTION 01 4533

CODE-REQUIRED SPECIAL INSPECTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Code-required special inspections.
B. Submittals.

1.02 DEFINITIONS


B. Authority Having Jurisdiction (AHJ): Agency or individual officially empowered to enforce the building, fire and life safety code requirements of the permitting jurisdiction in which the Project is located.

C. Special Inspection:
   1. Special inspections are inspections and testing of materials, installation, fabrication, erection or placement of components and connections mandated by the AHJ that also require special expertise to ensure compliance with the approved contract documents and the referenced standards.
   2. Special inspections are separate from and independent of tests and inspections conducted by Owner or Contractor for the purposes of quality assurance and contract administration.

1.03 REFERENCE STANDARDS

A. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.
E. AWS D1.3 - Structural Welding Code - Sheet Steel; 2008.

1.04 SUBMITTALS

A. Special Inspection Agency Qualifications: Prior to the start of work, the Special Inspection Agency shall:
   1. Submit agency name, address, and telephone number, names of full time registered Engineer and responsible officer.
   2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
   3. Submit certification that Special Inspection Agency is acceptable to AHJ.

B. Testing Agency Qualifications: Prior to the start of work, the Testing Agency shall:
   1. Submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
   2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.
3. Submit certification that Testing Agency is acceptable to AHJ.

1.05 SPECIAL INSPECTION AGENCY

A. Owner or Architect will employ services of a Special Inspection Agency to perform inspections and associated testing and sampling required by the building code.

B. Employment of agency in no way relieves Contractor of obligation to perform work in accordance with requirements of Contract Documents.

1.06 TESTING AND INSPECTION AGENCIES

A. Owner or Architect may employ services of an independent testing agency to perform additional testing and sampling associated with special inspections but not required by the building code.

B. Employment of agency in no way relieves Contractor of obligation to perform work in accordance with requirements of Contract Documents.

PART 3 EXECUTION

2.01 SCHEDULE OF SPECIAL INSPECTIONS, GENERAL

A. Frequency of Special Inspections: Special Inspections are indicated as continuous or periodic.
   1. Continuous Special Inspection: Special Inspection Agency shall be present in the area where the work is being performed and observe the work at all times the work is in progress.
   2. Periodic Special Inspection: Special Inspection Agency shall be present in the area where work is being performed and observe the work part-time or intermittently and at the completion of the work.

2.02 SPECIAL INSPECTIONS FOR STEEL CONSTRUCTION

A. High-Strength Bolt, Nut and Washer Material:
   1. Verify identification markings conform to ASTM standards specified in the approved contract and to AISC 360, A3.3; periodic.
   2. Submit manufacturer's certificates of compliance; periodic.

B. Weld Filler Material:
   1. Verify identification markings conform to AWS standards specified in the approved contract documents and to AISC 360, A3.5; periodic.
   2. Submit manufacturer's certificates of compliance; periodic.

C. Welding:
   1. Structural steel and cold formed steel deck:
      a. Complete and partial joint penetration groove welds: Verify compliance with AWS D1.1; continuous.
      b. Multipass fillet welds: Verify compliance with AWS D1.1; continuous.
      c. Single pass fillet welds less than 5/16 inch (7.94 mm) wide: Verify compliance with AWS D1.1; continuous.
      d. Plug and slot welds: Verify compliance with AWS D1.1; continuous.
      e. Single pass fillet welds 5/16 inch (7.94 mm) or greater: Verify compliance with AWS D1.1; periodic.
      f. Floor and roof deck welds: Verify compliance with AWS D1.3; continuous.
   2. Reinforcing Steel: Verify items listed below comply with AWS D1.4 and ACI 318, Section 3.5.2.
      a. Verification of weldability; periodic.
      b. Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames as well as boundary elements of special structural walls of concrete and shear reinforcement; continuous.
2.03 SPECIAL INSPECTIONS FOR CONCRETE CONSTRUCTION

A. Reinforcing Steel, Including Prestressing of Tendons and Placement: Verify compliance with approved contract documents and ACI 318, 3.5 and 7.1 through 7.7; periodic.

B. Reinforcing Steel Welding: Verify compliance with AWS D1.4 and ACI 318, 3.5.2; periodic.

C. Design Mix: Verify plastic concrete complies with the design mix in approved contract documents and with ACI 318, Chapter 4 and 5.2; periodic.

D. Specified Curing Temperature and Techniques: Verify compliance with approved contract documents and ACI 318, 5.11 through 5.13; periodic.

E. Concrete Strength in Situ: Verify concrete strength complies with approved contract documents and ACI 318, 6.2, for the following.

F. Formwork Shape, Location and Dimensions: Verify compliance with approved contract documents and ACI 318, 6.1.1; periodic.

2.04 SPECIAL INSPECTIONS FOR MASONRY CONSTRUCTION

A. Masonry Structures Subject to Special Inspection:
   1. Empirically designed masonry, glass unit masonry and masonry veneer in structures designated as "essential facilities".
   2. Engineered masonry in structures classified as "low hazard..." and "substantial hazard to human life in the event of failure".

END OF SECTION
SECTION 01 5000

TEMPORARY FACILITIES AND CONTROLS

PART 1  GENERAL

1.01 SECTION INCLUDES

A. Temporary utilities.
B. Temporary telecommunications services.
C. Temporary sanitary facilities.
D. Temporary Controls: Barriers, enclosures, and fencing.
E. Vehicular access and parking.
F. Waste removal facilities and services.

1.02 RELATED REQUIREMENTS

A. Section 01 5100 - Temporary Utilities.
B. Section 01 5500 - Vehicular Access and Parking.

1.03 TEMPORARY UTILITIES - See Section 01 5100

A. Owner will provide the following:
   1. Electrical power and metering, consisting of connection to existing facilities.
   2. Water supply, consisting of connection to existing facilities.
B. New permanent facilities may be used.

1.04 TELECOMMUNICATIONS SERVICES

A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization.
B. Telecommunications services shall include:

1.05 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.
B. Maintain daily in clean and sanitary condition.

1.06 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public, to allow for owner's use of site and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
B. Provide barricades and covered walkways required by governing authorities for public rights-of-way and for public access to existing building.
C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.07 FENCING

A. Provide 6 foot (1.8 m) high fence around construction site; equip with vehicular and pedestrian gates with locks.

1.08 VEHICULAR ACCESS AND PARKING - See Section 01 5500
A. Coordinate access and haul routes with governing authorities and Owner.

B. Provide and maintain access to fire hydrants, free of obstructions.

C. Provide means of removing mud from vehicle wheels before entering streets.

D. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

1.09 WASTE REMOVAL

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

B. Provide containers with lids. Remove trash from site periodically.

C. If materials to be recycled or re-used on the project must be stored on-site, provide suitable non-combustible containers; locate containers holding flammable material outside the structure unless otherwise approved by the authorities having jurisdiction.

D. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION
SECTION 01 5100
TEMPORARY UTILITIES

PART 1  GENERAL

1.01 SECTION INCLUDES
   A. Temporary Utilities: Electricity, lighting, heat, ventilation, and water.

1.02 TEMPORARY ELECTRICITY
   A. Cost: By Owner.
   B. Provide main service disconnect and over-current protection at convenient location and meter.
   C. Permanent convenience receptacles may be utilized during construction.
   D. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

1.03 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES
   A. Provide and maintain incandescent lighting for construction operations to achieve a minimum lighting level of 2 watt/sq ft (21 watt/sq m).
   B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
   C. Maintain lighting and provide routine repairs.

1.04 TEMPORARY HEATING
   A. Cost of Energy: By Contractor.
   B. Provide heating devices and heat as needed to maintain specified conditions for construction operations.
   C. Maintain minimum ambient temperature of 50 degrees F (10 degrees C) in areas where construction is in progress, unless indicated otherwise in specifications.

PART 2  PRODUCTS - NOT USED

PART 3  EXECUTION - NOT USED

END OF SECTION
SECTION 01 5213

FIELD OFFICES AND SHEDS

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Temporary field offices for use of Contractor.
B. Maintenance and removal.

1.02  RELATED REQUIREMENTS

A. Section 01 5000 - Temporary Facilities and Controls:
B. Section 01 5500 - Vehicular Access and Parking: Parking and access to field offices.

1.03  USE OF EXISTING FACILITIES

A. Structural
B. Designated existing spaces may be used for field offices: north of the existing automotive building.

PART 2  PRODUCTS

2.01  MATERIALS, EQUIPMENT, FURNISHINGS

2.02  CONSTRUCTION

A. Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations, with steps and landings at entrance doors.

2.03  Contractor OFFICE AND FACILITIES

A. Size: For Contractor's needs and to provide space for project meetings.

PART 3  EXECUTION

3.01  INSTALLATION

A. Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.

3.02  REMOVAL

A. At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

END OF SECTION
SECTION 01 5721

INDOOR AIR QUALITY CONTROLS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Construction procedures to promote adequate indoor air quality after construction.

1.02 PROJECT GOALS
A. Dust and Airborne Particulates: Prevent deposition of dust and other particulates in HVAC ducts and equipment.
   1. Cleaning of ductwork is not contemplated under this Contract.
   2. Contractor shall bear the cost of cleaning required due to failure to protect ducts and equipment from construction dust.
B. Airborne Contaminants: Procedures and products have been specified to minimize indoor air pollutants.
   1. Furnish products meeting the specifications.
   2. Avoid construction practices that could result in contamination of installed products leading to indoor air pollution.
C. Ventilation: HVAC system has been designed to achieve the minimum requirements for ventilation specified in ASHRAE 62.1.

1.03 REFERENCE STANDARDS
A. ASHRAE Std 62.1 - Ventilation For Acceptable Indoor Air Quality; 2012.

1.04 DEFINITIONS
A. Adsorptive Materials: Gypsum board, acoustical ceiling tile and panels, carpet and carpet tile, fabrics, fibrous insulation, and other similar products.
B. Contaminants: Gases, vapors, regulated pollutants, airborne mold and mildew, and the like, as specified.
C. Particulates: Dust, dirt, and other airborne solid matter.
D. Wet Work: Concrete, plaster, coatings, and other products that emit water vapor or volatile organic compounds during installation, drying, or curing.

PART 3 EXECUTION

2.01 CONSTRUCTION PROCEDURES
A. Prevent the absorption of moisture and humidity by adsorptive materials by:
   1. Sequencing the delivery of such materials so that they are not present in the building until wet work is completed and dry.
   2. Delivery and storage of such materials in fully sealed moisture-impermeable packaging.
   3. Provide sufficient ventilation for drying within reasonable time frame.
B. Begin construction ventilation when building is substantially enclosed.
C. Do not store construction materials or waste in mechanical or electrical rooms.
D. Prior to use of return air ductwork without intake filters clean up and remove dust and debris generated by construction activities.
   1. Inspect duct intakes, return air grilles, and terminal units for dust.
   2. Clean plenum spaces, including top sides of lay-in ceilings, outsides of ducts, tops of pipes.
and conduit.
3. Clean tops of doors and frames.
4. Clean mechanical and electrical rooms, including tops of pipes, ducts, and conduit, equipment, and supports.
5. Clean return plenums of air handling units.
6. Remove intake filters last, after cleaning is complete.

E. Do not perform dusty or dirty work after starting use of return air ducts without intake filters.

F. Use other relevant recommendations of SMACNA IAQ Guideline for Occupied Buildings Under Construction for avoiding unnecessary contamination due to construction procedures.

END OF SECTION
SECTION 01 6000

PRODUCT REQUIREMENTS

PART 1  GENERAL

1.01 SECTION INCLUDES
   A. Transportation, handling, storage and protection.
   B. Product option requirements.
   C. Substitution limitations and procedures.
   D. Procedures for Owner-supplied products.

1.02 RELATED REQUIREMENTS
   A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.

1.03 SUBMITTALS
   A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
   B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
   C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
      1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2  PRODUCTS

2.01 NEW PRODUCTS
   A. Provide new products unless specifically required or permitted by the Contract Documents.
   B. Do not use products having any of the following characteristics:
      1. Made outside the United States, its territories, Canada, or Mexico.
      2. Made using or containing CFC's or HCFC's.
   C. Where all other criteria are met, Contractor shall give preference to products that:
      1. Have longer documented life span under normal use.

2.02 PRODUCT OPTIONS
   A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
   B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
   C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

PART 3  EXECUTION

3.01 SUBSTITUTION PROCEDURES
A. Instructions to Bidders specify time restrictions for submitting requests for substitutions during the bidding period. Comply with requirements specified in this section.

B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

C. A request for substitution constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Will provide the same warranty for the substitution as for the specified product.
   3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.

D. Substitution Submittal Procedure:
   1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
   2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
   3. The Architect will notify Contractor in writing of decision to accept or reject request.

3.02 OWNER-SUPPLIED PRODUCTS

A. Owner's Responsibilities:
   1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
   2. Arrange and pay for product delivery to site.
   3. On delivery, inspect products jointly with Contractor.
   4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
   5. Arrange for manufacturers' warranties, inspections, and service.

B. Contractor's Responsibilities:
   1. Review Owner reviewed shop drawings, product data, and samples.
   2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
   3. Handle, store, install and finish products.
   4. Repair or replace items damaged after receipt.

3.03 TRANSPORTATION AND HANDLING

A. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

B. Transport and handle products in accordance with manufacturer's instructions.

C. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

D. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

E. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

F. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 STORAGE AND PROTECTION

A. Designate receiving/storage areas for incoming products so that they are delivered according to
installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers’ instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

G. Prevent contact with material that may cause corrosion, discoloration, or staining.

H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION
SECTION 01 6116

VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. VOC restrictions for product categories listed below under "DEFINITIONS."

B. All products of each category that are installed in the project must comply; Owner's project goals do not allow for partial compliance.

1.02 RELATED REQUIREMENTS

A. Section 01 6000 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.

1.03 DEFINITIONS

A. VOC-Restricted Products: All products of each of the following categories when installed or applied on-site in the building interior:
   1. Adhesives, sealants, and sealer coatings.
   2. Paints and coatings.
   3. Insulation.

B. Interior of Building: Anywhere inside the exterior weather barrier.

C. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.

D. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.

1.04 REFERENCE STANDARDS

A. CAL (CHPS LEM) - Low-Emitting Materials Product List; California Collaborative for High Performance Schools (CHPS); current edition at www.chps.net/.


C. GEI (SCH) - GREENGUARD "Children and Schools" Certified Products; GREENGUARD Environmental Institute; current listings at www.greenguard.org.

D. GreenSeal GC-03 - Anti-Corrosive Paints; Green Seal, Inc.; 2007

E. GreenSeal GS-36 - Commercial Adhesives; Green Seal, Inc.; 2011.


G. SCS (CPD) - SCS Certified Products; Scientific Certification Systems; current listings at www.scscertified.com.

1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Evidence of Compliance: Submit for each different product in each applicable category.

C. Product Data: For each VOC-restricted product used in the project, submit product data showing compliance, except when another type of evidence of compliance is required.
D. Installer Certifications for Accessory Materials: Require each installer of any type of product (not just the products for which VOC restrictions are specified) to certify that either 1) no adhesives, joint sealants, paints, coatings, or composite wood or agrifiber products have been used in the installation of his products, or 2) that such products used comply with these requirements.

1.06 QUALITY ASSURANCE

A. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS

2.01 MATERIALS

A. All VOC-Restricted Products: Provide products having VOC content of types and volume not greater than those specified in State of California Department of Health Services Standard Practice for the Testing of Volatile Organic Emissions From Various Sources Using Small-Scale Environmental Chambers.

1. Evidence of Compliance: Acceptable types of evidence are:
   d. Current certification by any other agencies acceptable to CHPS.
   e. Report of laboratory testing performed in accordance with CHPS requirements for getting a product listed in the Low-Emitting Materials Product List; report must include laboratory's statement that the product meets the specified criteria.

2. Product data submittals showing VOC content are NOT acceptable forms of evidence.

B. Adhesives and Joint Sealants: Provide only products having volatile organic compound (VOC) content not greater than required by South Coast Air Quality Management District Rule No.1168.

1. Evidence of Compliance: Acceptable types of evidence are:
   a. Report of laboratory testing performed in accordance with requirements.

C. Aerosol Adhesives: Provide only products having volatile organic compound (VOC) content not greater than required by GreenSeal GS-36.

1. Evidence of Compliance: Acceptable types of evidence are:
   a. Current GreenSeal Certification.

D. Paints and Coatings: Provide products having VOC content as specified in Section 09 9000.

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.

B. All additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

END OF SECTION
SECTION 01 7000
EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Examination, preparation, and general installation procedures.
B. Requirements for alterations work, including selective demolition, except removal, disposal, and/or remediation of hazardous materials and toxic substances.
C. Cutting and patching.
D. Surveying for laying out the work.
E. Cleaning and protection.
F. Closeout procedures, except payment procedures.
G. General requirements for maintenance service.

1.02 RELATED REQUIREMENTS
A. Section 01 1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.
B. Section 01 3000 - Administrative Requirements: Submittals procedures.
C. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.
D. Section 02 4100 - Demolition: Demolition of whole structures and parts thereof; site utility demolition.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
   1. On request, submit documentation verifying accuracy of survey work.
   2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in conformance with Contract Documents.
   3. Submit surveys and survey logs for the project record.
C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
   1. Structural integrity of any element of Project.
   2. Integrity of weather exposed or moisture resistant element.
   3. Efficiency, maintenance, or safety of any operational element.
   5. Work of Owner or separate Contractor.

1.05 QUALIFICATIONS
A. For survey work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of Surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate.

1.06 PROJECT CONDITIONS
A. Use of explosives is not permitted.

B. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

C. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

D. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.

E. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

F. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

1.07 COORDINATION

A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Notify affected utility companies and comply with their requirements.

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

D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

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

F. Coordinate completion and clean-up of work of separate sections.

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

PART 2 PRODUCTS

2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.03 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Architect of any discrepancies discovered.

C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.

F. Utilize recognized engineering survey practices.

G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
   1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations; and ________.
   2. Grid or axis for structures.
   3. Building foundation, column locations, ground floor elevations, and ________.

H. Periodically verify layouts by same means.

I. Maintain a complete and accurate log of control and survey work as it progresses.

3.04 GENERAL INSTALLATION REQUIREMENTS

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
E. Make neat transitions between different surfaces, maintaining texture and appearance.

3.05 ALTERATIONS

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as shown.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of alterations work constitutes acceptance of existing conditions.

B. Remove existing work as indicated and as required to accomplish new work.
   1. Remove items indicated on drawings.
   2. Relocate items indicated on drawings.
   3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
   4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

C. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove, relocate, and extend existing systems to accommodate new construction.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
   2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.
   3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
      a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
      b. Provide temporary connections as required to maintain existing systems in service.
   4. Verify that abandoned services serve only abandoned facilities.
   5. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.

D. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.

E. Adapt existing work to fit new work: Make as neat and smooth transition as possible.

F. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

G. Refinish existing surfaces as indicated:
   1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
   2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.
H. Clean existing systems and equipment.
I. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.
J. Do not begin new construction in alterations areas before demolition is complete.
K. Comply with all other applicable requirements of this section.

3.06 CUTTING AND PATCHING
A. Whenever possible, execute the work by methods that avoid cutting or patching.
B. See Alterations article above for additional requirements.
C. Perform whatever cutting and patching is necessary to:
   1. Complete the work.
   2. Fit products together to integrate with other work.
   3. Provide openings for penetration of mechanical, electrical, and other services.
   4. Match work that has been cut to adjacent work.
   5. Repair areas adjacent to cuts to required condition.
   6. Repair new work damaged by subsequent work.
   7. Remove samples of installed work for testing when requested.
   8. Remove and replace defective and non-conforming work.
D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
E. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
F. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
G. Restore work with new products in accordance with requirements of Contract Documents.
H. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400, to full thickness of the penetrated element.
J. Patching:
   1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
   2. Match color, texture, and appearance.
   3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

3.07 PROGRESS CLEANING
A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning
to eliminate dust.

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

3.08 PROTECTION OF INSTALLED WORK

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Remove protective coverings when no longer needed; reuse or recycle plastic coverings if possible.

3.09 ADJUSTING

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

3.10 FINAL CLEANING

A. Use cleaning materials that are nonhazardous.

B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

E. Clean filters of operating equipment.

F. Clean debris from roofs, gutters, downspouts, and drainage systems.

G. Clean site; sweep paved areas, rake clean landscaped surfaces.

H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

3.11 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities.
   1. Provide copies to Architect.

B. Notify Architect when work is considered ready for Substantial Completion.

C. Submit written certification that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's review.

D. Correct items of work listed in executed Certificates of Substantial Completion and comply with requirements for access to Owner-occupied areas.
E. Notify Architect when work is considered finally complete.
F. Complete items of work determined by Architect's final inspection.

3.12 MAINTENANCE
A. Provide service and maintenance of components indicated in specification sections.
B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

END OF SECTION
PART 1 GENERAL

1.01 WASTE MANAGEMENT REQUIREMENTS

A. Owner requires that this project generate the least amount of trash and waste possible.

B. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

C. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

D. Required Recycling, Salvage, and Reuse: The following may not be disposed of in landfills or by incineration:
   1. Aluminum and plastic beverage containers.
   2. Corrugated cardboard.
   3. Wood pallets.
   4. Clean dimensional wood: May be used as blocking or furring.
   5. Land clearing debris, including brush, branches, logs, and stumps: See Section 31 1000 for use options.
   6. Metals, including packaging banding, metal studs, sheet metal, structural steel, piping, reinforcing bars, door frames, and other items made of steel, iron, galvanized steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
   7. Carpet, carpet cushion, carpet tile, and carpet remnants, both new and removed: DuPont (http://flooring.dupont.com) and Interface (www.interfaceinc.com) conduct reclamation programs.

E. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, incineration, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.

F. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.
   2. Burying on the project site.
   3. Dumping or burying on other property, public or private.
   4. Other illegal dumping or burying.

G. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.

B. Section 01 5000 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.

C. Section 01 6000 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.

D. Section 01 7000 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

E. Section 31 1000 - Site Clearing: Handling and disposal of land clearing debris.
1.03 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Waste Disposal Reports: Submit at specified intervals, with details of quantities of trash and waste, means of disposal or reuse, and costs; show both totals to date and since last report.
   1. Submit updated Report with each Application for Progress Payment; failure to submit Report will delay payment.
   2. Submit Report on a form acceptable to Owner.
   3. Landfill Disposal: Include the following information:
      a. Identification of material.
      b. Amount, in tons or cubic yards (cubic meters), of trash/waste material from the project disposed of in landfills.
      c. State the identity of landfills, total amount of tipping fees paid to landfill, and total disposal cost.
d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.

4. Incinerator Disposal: Include the following information:
   a. Identification of material.
   b. Amount, in tons or cubic yards (cubic meters), of trash/waste material from the project delivered to incinerators.
   c. State the identity of incinerators, total amount of fees paid to incinerator, and total disposal cost.
   d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.

5. Recycled and Salvaged Materials: Include the following information for each:
   a. Identification of material, including those retrieved by installer for use on other projects.
   b. Amount, in tons or cubic yards (cubic meters), date removed from the project site, and receiving party.
   c. Transportation cost, amount paid or received for the material, and the net total cost or savings of salvage or recycling each material.
   d. Include manifests, weight tickets, receipts, and invoices as evidence of quantity and cost.
   e. Certification by receiving party that materials will not be disposed of in landfills or by incineration.

6. Material Reused on Project: Include the following information for each:
   a. Identification of material and how it was used in the project.
   b. Amount, in tons or cubic yards (cubic meters).
   c. Include weight tickets as evidence of quantity.

7. Other Disposal Methods: Include information similar to that described above, as appropriate to disposal method.

PART 3  EXECUTION

2.01 WASTE MANAGEMENT PROCEDURES
   A. See Section 01 3000 for additional requirements for project meetings, reports, submittal procedures, and project documentation.
   B. See Section 01 5000 for additional requirements related to trash/waste collection and removal facilities and services.
   C. See Section 01 6000 for waste prevention requirements related to delivery, storage, and handling.
   D. See Section 01 7000 for trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

2.02 WASTE MANAGEMENT PLAN IMPLEMENTATION
   A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.
   B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.
   C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.
   D. Meetings: Discuss trash/waste management goals and issues at project meetings.
      1. Pre-bid meeting.
      2. Pre-construction meeting.
3. Regular job-site meetings.

E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
   1. Provide containers as required.
   2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
   3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

END OF SECTION
SECTION 01 7800

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Project Record Documents.
B. Warranties and bonds.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Addenda.
   3. Change Orders and other modifications to the Contract.
B. Ensure entries are complete and accurate, enabling future reference by Owner.
C. Store record documents separate from documents used for construction.
D. Record information concurrent with construction progress.
E. Record Drawings: Legibly mark each item to record actual construction including:
   1. Field changes of dimension and detail.
   2. Details not on original Contract drawings.

3.02 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers,
   and manufacturers, within 10 days after completion of the applicable item of work. Except for
   items put into use with Owner's permission, leave date of beginning of time of warranty until the
   Date of Substantial completion is determined.
B. Verify that documents are in proper form, contain full information, and are notarized.
C. Co-execute submittals when required.
D. Retain warranties and bonds until time specified for submittal.

END OF SECTION
SECTION 02 4100

DEMOLITION

PART 3 EXECUTION

1.01 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   3. Provide, erect, and maintain temporary barriers and security devices.
   4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   5. Do not close or obstruct roadways or sidewalks without permit.
   6. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
   7. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

1.02 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION
SECTION 04 2000
UNIT MASONRY

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Concrete Block.
B. Mortar and Grout.
C. Reinforcement and Anchorage.
D. Flashings.
E. Lintels.
F. Accessories.

1.02 RELATED REQUIREMENTS
A. Section 03 2000 - Concrete Reinforcing: Reinforcing steel for grouted masonry.
B. Section 04 0511 - Masonry Mortaring and Grouting.
C. Section 06 1000 - Rough Carpentry: Nailing strips built into masonry.

1.03 REFERENCE STANDARDS
A. ACI 530/530.1/ERTA - Building Code Requirements and Specification for Masonry Structures and Related Commentaries; American Concrete Institute International; 2011.

1.04 ADMINISTRATIVE REQUIREMENTS
A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

1.05 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data for masonry units, mortar, and masonry accessories.
C. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

1.06 QUALITY ASSURANCE
A. Comply with provisions of ACI 530/530.1/ERTA, except where exceeded by requirements of the contract documents.

1.07 DELIVERY, STORAGE, AND HANDLING
A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.01 CONCRETE MASONRY UNITS
A. Concrete Block: Comply with referenced standards and as follows:
   1. Size: Standard units with nominal face dimensions of 16 x 8 inches (400 x 200 mm) and nominal depths as indicated on the drawings for specific locations.
   2. Special Shapes: Provide non-standard blocks configured for corners.
   3. Load-Bearing Units: ASTM C90, normal weight.
      a. Solid block see structural notes.
      a. Hollow block, as indicated.

2.02 MORTAR AND GROUT MATERIALS
A. Mortar: As specified in structural notes.
B. Masonry Cement: ASTM C91, Type N.
   1. Colored mortar: Premixed cement as required to match Architect's color sample.
   2. Substitutions: See Section 01 6000 - Product Requirements.
C. Mortar Aggregate: ASTM C144.
E. Water: Clean and potable.

2.03 REINFORCEMENT AND ANCHORAGE
A. Manufacturers of Joint Reinforcement and Anchors:
   1. Substitutions: See Section 01 6000 - Product Requirements.
B. Reinforcing Steel: Type specified in Section 03 2000; size as indicated on drawings; galvanized finish.
C. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.
D. Single Wythe Joint Reinforcement: Truss or ladder type; ASTM A 82/A 82M steel wire, mill galvanized to ASTM A 641/A 641M, Class 3; 0.1483 inch (3.8 mm) side rods with 0.1483 inch (3.8 mm) cross rods; width as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage on each exposure.
E. Strap Anchors: Bent steel shapes configured as required for specific situations, 1-1/4 in (32 mm) width, 0.105 in (2.7 mm) thick, lengths as required to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage from masonry face, corrugated for embedment in masonry joint, hot dip galvanized to ASTM A 153/A 153M, Class B.
F. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm)
mm) of mortar coverage from masonry face.

2.04 FLASHINGS
   A. Copper/Kraft Paper Flashings: 3 oz/sq ft (915 g/sq m) sheet copper bonded to fiber reinforced asphalt treated Kraft paper.
      1. Manufacturers:
         b. Substitutions: See Section 01 6000 - Product Requirements.

2.05 ACCESSORIES
   A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
   B. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
   C. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.06 MORTAR AND GROUT MIXES
   A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
      1. Exterior, loadbearing masonry: Type N.
      2. Exterior, non-loadbearing masonry: Type N.
   B. Grout: ASTM C476. Consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches (50 mm) or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches (50 mm).

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that field conditions are acceptable and are ready to receive masonry.
   B. Verify that related items provided under other sections are properly sized and located.

3.02 PREPARATION
   A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

3.03 COLD AND HOT WEATHER REQUIREMENTS
   A. Comply with requirements of ACI 530/530.1/ERTA or applicable building code, whichever is more stringent.

3.04 COURSING
   A. Establish lines, levels, and coursing indicated. Protect from displacement.
   B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
   C. Concrete Masonry Units:
      1. Bond: Running.
      2. Coursing: One unit and one mortar joint to equal 8 inches (200 mm).

3.05 PLACING AND BONDING
   A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Remove excess mortar and mortar smears as work progresses.

E. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

3.06 CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

3.07 REINFORCEMENT AND ANCHORAGE - GENERAL

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches (400 mm) on center.

B. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches (900 mm) horizontally and 24 inches (600 mm) vertically.

3.08 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.

1. Extend flashings full width at such interruptions and at least 4 inches (100 mm) into adjacent masonry or turn up at least 4 inches (100 mm) to form watertight pan at non-masonry construction.

3.09 LINTELS

A. Install loose steel lintels over openings.

3.10 CONTROL AND EXPANSION JOINTS

A. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

3.11 TOLERANCES

A. Maximum Variation from Alignment of Columns: 1/4 inch (6 mm).

B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch (1.6 mm).

C. Maximum Variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.

D. Maximum Variation from Level Coursing: 1/8 inch in 3 ft (3 mm/m) and 1/4 inch in 10 ft (6 mm/3 m); 1/2 inch in 30 ft (13 mm/9 m).

3.12 CUTTING AND FITTING

A. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.13 CLEANING

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

3.14 PROTECTION
A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

3.15 SCHEDULES

A. Interior half walls and load bearing walls at 101 and 102: Single wythe concrete block units.
SECTION 06 1000
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Concealed wood blocking, nailers, and supports.

1.02 RELATED REQUIREMENTS

1.03 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.04 DELIVERY, STORAGE, AND HANDLING
A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS
A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
   2. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
B. Lumber fabricated from old growth timber is not permitted.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS
A. Sizes: Nominal sizes as indicated on drawings, S4S.
B. Moisture Content: S-dry or MC19.
C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL
A. Select material sizes to minimize waste.
B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

3.02 BLOCKING, NAILERS, AND SUPPORTS
A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.

D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

3.03 TOLERANCES

A. Framing Members: 1/4 inch (6 mm) from true position, maximum.

B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

3.04 CLEANING

A. Waste Disposal: Comply with the requirements of Section 01 7419.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION
SECTION 07 2400
EXTERIOR INSULATION AND FINISH SYSTEMS

PART 1  GENERAL

1.01  SECTION INCLUDES
   A. Composite wall and soffit cladding of rigid insulation and reinforced finish coating ("Class PB").
   B. Drainage and water-resistive barriers behind insulation board.

1.02  RELATED REQUIREMENTS
   A. Section 06 1000 - Rough Carpentry: Sheathing on wood framing.
   B. Section 07 9005 - Joint Sealers: Perimeter and penetration sealants.

1.03  SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Shop Drawings: Indicate wall and soffit joint patterns, joint details, and molding profiles.
   C. Product Data: Provide data on system materials, product characteristics, performance criteria, and system limitations.
   D. Manufacturer's Installation Instructions: Indicate preparation required, installation techniques, and jointing requirements.

1.04  QUALITY ASSURANCE
   A. Maintain copy of specified installation standard and manufacturer's installation instructions at project site at all times during installation.
   B. EIFS Manufacturer Qualifications: Provide all EIFS products other than insulation from the same manufacturer with qualifications as follows:
      1. Manufacturer of EIFS products for not less than 5 years.
   C. Insulation Manufacturer Qualifications: Approved by manufacturer of EIFS and approved and labeled under third party quality program as required by applicable building code.
   D. Installer Qualifications: Company specializing in EIFS work, with not less than ___ years of documented experience, and approved by the EIFS manufacturer.

1.05  MOCK-UP
   A. Construct mock-up of typical EIFS application on specified substrate, size as indicated on drawings, and including flashings, joints, and edge conditions.
   B. Locate mock-up as indicated on drawings.

1.06  DELIVERY, STORAGE, AND HANDLING
   A. Delivery: Deliver materials to project site in manufacturer’s original, unopened containers with labels intact. Inspect materials and notify manufacturer of any discrepancies.
   B. Storage: Protect adhesives and finish materials from freezing and temperatures in excess of 90 degrees F (32 degrees C).
      1. Protect Portland cement based materials from moisture and humidity. Store under cover off the ground in a dry location.
      2. Protect insulation materials from exposure to sunlight.

1.07  FIELD CONDITIONS
A. Do not prepare materials or apply EIFS during inclement weather unless areas of installation are protected. Protect installed EIFS areas from inclement weather until dry.

B. Do not install coatings or sealants when ambient temperature is below 40 degrees F (5 degrees C).

C. Do not leave installed insulation board exposed to sunlight for extended periods of time.

1.08 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide manufacturer’s standard material warranty, covering a period of not less than 5 years.

PART 2  PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:
   2. Substitutions:  See Section 01 6000 - Product Requirements.

2.02 EXTERIOR INSULATION AND FINISH SYSTEM

A. Exterior Insulation and Finish System:  DRAINAGE type; reinforced finish coating on flat-backed insulation board adhesive-applied directly to water-resistive coating over substrate; provide a complete system that has been tested to show compliance with the following characteristics; include all components of specified system and substrate(s) in tested samples.

B. Exterior Insulation and Finish System:  DRAINAGE type; reinforced finish coating on flat-backed insulation board adhesive-applied directly to water-resistive coating over substrate; provide a complete system that has been tested to show compliance with the following characteristics; include all components of specified system and substrate(s) in tested samples.

C. Fire Characteristics:
   1. Flammability:  Pass, when tested in accordance with NFPA 285.
   2. Ignitibility:  No sustained flaming when tested in accordance with NFPA 268.
   3. Potential Heat of Foam Plastic Insulation Tested Independently of Assembly: No portion of the assembly having potential heat that exceeds that of the insulation sample tested for flammability (above), when tested in accordance with NFPA 259 with results expressed in Btu per square foot (mJ/sq m).

D. Adhesion of Water-Resistive Coating to Substrate:  For each combination of coating and substrate, minimum flatwise tensile bond strength of 15 psi (105 kPa), when tested in accordance with ASTM C297/C297M.

E. Adhesion to Water-Resistive Coating:  For each combination of insulation board and substrate, when tested in accordance with ASTM C297/C297M, maximum adhesive failure of 25 percent unless flatwise tensile bond strength exceeds 15 psi (105 kPa) in all samples.

F. Water Penetration Resistance:  No water penetration beyond the plane of the base coat/insulation board interface after 15 minutes, when tested in accordance with ASTM E331 at 6.24 psf (299 Pa) differential pressure with tracer dye in the water spray; include in tested sample at least two vertical joints and one horizontal joint of same type to be used in construction; disassemble sample if necessary to determine extent of water penetration.

G. Drainage Efficiency:  Average minimum efficiency of 90 percent, when tested in accordance with ASTM E2273 for 75 minutes.

H. Salt Spray Resistance:  No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 300 hours exposure in accordance with ASTM
B117, using at least three samples matching intended assembly, at least 4 by 6 inches (100 by 150 mm) in size.

I. Freeze-Thaw Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 10 cycles, when tested in accordance with ICC-ES AC 219 or 235.

J. Weathering Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating when viewed under 5x magnification after 2000 hours of accelerated weathering conducted in accordance with ASTM G153 Cycle 1 or ASTM G155 Cycle 1, 5, or 9.

K. Water Degradation Resistance: No cracking, checking, crazing, erosion, blistering, peeling, delamination, or corrosion of finish coating after 14 days exposure, when tested in accordance with ASTM D2247.

L. Mildew Resistance: No growth supported on finish coating during 28 day exposure period, when tested in accordance with ASTM D3273.

M. Abrasion Resistance Of Finish: No cracking, checking or loss of film integrity when tested in accordance with ASTM D968 with 500 liters of sand.

N. Impact Resistance: Construct system to provide the following impact resistance without exposure of broken reinforcing mesh, when tested in accordance with ASTM E2486:
   1. Standard: 25 to 49 in-lb (2.83 to 5.54 J), for areas not indicated as requiring higher impact resistance.

2.03 MATERIALS

A. Finish Coating Top Coat: Water-based, air curing, acrylic or polymer-based finish with integral color and texture.
   1. Texture: Medium.
   2. Color: As selected by Architect from manufacturer's standard range.

B. Base Coat: Fiber-reinforced, acrylic or polymer-based product compatible with insulation board and reinforcing mesh.

C. Reinforcing Mesh: Balanced, open weave glass fiber fabric, treated for compatibility and improved bond with coating, weight, strength, and number of layers as required to meet required system impact rating.

D. Insulation Board: Molded, expanded polystyrene board; ASTM C578, Type I; with the following characteristics:
   1. Board Size: 24 by 48 inches (610 by 1220 mm).
   2. Board Size Tolerance: plus/minus 1/16 inch (1.5 mm) from square and dimension.
   3. Board Thickness: 2 inches (50 mm).
   4. Thickness Tolerance: plus/minus 1/16 inch (1.5 mm) maximum.
   6. Thermal Resistance (R factor per 1 in (25.4 mm)) at 75 degrees F (24 degrees C): 3.60 (0.63).
   7. Board Density: 0.9 lb/cu ft (15 kg/cu m).
   9. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, when tested in accordance with ASTM E84.

   1. Size: 1/2 inch (12.0 mm) thick, 32 by 96 inches (813.0 by 2438.4 mm) panels.

F. Water-Resistive Barrier: Fluid-applied coating forming air and water barrier membrane; applied to
sheathing; furnished or approved by EIFS manufacturer.

2.04 ACCESSORY MATERIALS
   A. Insulation Adhesive: Type required by EIFS manufacturer for project substrate.
   B. Trim: EIFS manufacturer’s standard PVC or galvanized steel trim accessories, as required for a complete project and including starter track, and drainage accessories.
   C. Sealant Materials: As recommended by EIFS manufacturer.

PART 3 EXECUTION

3.01 GENERAL
   A. Install in accordance with EIFS manufacturer’s instructions and ASTM C1397.
   B. Where different requirements appear in either document, comply with the most stringent.
   C. Neither of these documents supersedes the provisions of the Contract Documents that define the contractual relationships between the parties or the scope of work.

3.02 EXAMINATION
   A. Verify that substrate is sound and free of oil, loose materials, or protrusions that could interfere with EIFS installation and is of a type and construction that is acceptable to EIFS manufacturer. Do not begin work until substrate and adjacent materials are complete and thoroughly dry.
   B. Verify that substrate surface is flat, with no deviation greater than 1/4 in (6 mm) when tested with a 10 ft (3 m) straightedge.

3.03 INSTALLATION - WATER-RESISTIVE BARRIER
   A. Apply barrier coating as recommended by coating manufacturer; prime substrate as required before application.
   B. Seal all substrate transitions and intersections with other materials to form continuous water-resistive barrier on exterior of sheathing, using method recommended by manufacturer.
   C. At door and window openings, seal water-resistive barrier to rough opening structure before installation of metal flashings, sills, or frames, using method recommended by manufacturer.
   D. Lap flashing tape at least 2 inches (50 mm) on each side of joint or transition.

3.04 INSTALLATION - INSULATION
   A. Install in accordance with manufacturer’s instructions.
   B. Install back wrap reinforcing mesh at all openings and terminations that are not to be protected with trim.
   C. On wall surfaces, install boards horizontally. On horizontal surfaces, install boards _______.
   D. Place boards in a method to maximize tight joints. Stagger vertical joints and interlock at corners. Butt edges and ends tight to adjacent board and to protrusions. Achieve a continuous flush insulation surface, with no gaps in excess of 1/16 inch (1.6 mm).
   E. Rasp irregularities off surface of installed insulation board.
   F. Adhesive Attachment: Use method required by manufacturer to achieve drainage efficiency specified; do not close up drainage channels when placing insulation board.

3.05 INSTALLATION - FINISH
   A. Base Coat: Apply in thickness as necessary to fully embed reinforcing mesh, wrinkle free,
including back-wrap at all terminations of the EIFS. Install reinforcing fabric as recommended by EIFS manufacturer.

1. Lap reinforcing mesh edges and ends a minimum of 2-1/2 inches (64 mm).
2. Allow base coat to dry a minimum of 24 hours before next coating application.

B. Apply finish coat after base coat has dried not less than 24 hours, embed finish aggregate, and finish to a uniform texture and color.

C. Apply sealant at finish perimeter and expansion joints in accordance with Section 07 9005.

3.06 CLEANING

A. Clean EIFS surfaces and work areas of foreign materials resulting from EIFS operations.

END OF SECTION
SECTION 07 6200

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings, counterflashings, and sheet metal roofing.

1.02 REFERENCE STANDARDS


1.03 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS

A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 0.02 inch (0.6 mm) thick base metal.

B. Pre-Finished Aluminum: ASTM B209 (ASTM B209M); 0.032 inch (0.8 mm) thick; plain finish shop pre-coated with modified silicone coating.

2.02 ACCESSORIES
A. Fasteners: Galvanized steel, with soft neoprene washers.
B. Primer: Zinc chromate type.
C. Sealant: Type ____ specified in Section 07 9005.
D. Plastic Cement: ASTM D4586, Type I.

2.03 FABRICATION
A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
B. Form pieces in longest possible lengths.
C. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.
D. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
E. Fabricate corners from one piece with minimum 18 inch (450 mm) long legs; seam for rigidity, seal with sealant.
F. Fabricate flashings to allow toe to extend 2 inches (50 mm) over roofing gravel. Return and brake edges.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 INSTALLATION
A. Conform to drawing details.
B. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
C. Apply plastic cement compound between metal flashings and felt flashings.
D. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Manufactured roof specialties, including copings, fascias, and vents.
   B. Roof control and expansion joint covers.

1.02 RELATED REQUIREMENTS
   A. Section 07 7200 - Roof Accessories: Manufactured curbs, roof hatches, and snow guards.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.

1.05 QUALITY ASSURANCE
   A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual details.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Roof Edge Flashings and Copings:
      1. Material: Aluminum or steel custom color to match exterior insulated panel.
      2. Substitutions: See Section 01 6000 - Product Requirements.
   B. Control and Expansion Joint Covers:
      3. Substitutions: See Section 01 6000 - Product Requirements.
   C. Pipe and Penetration Flashings:
      2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 COMPONENTS
   A. Roof Edge Flashings: Factory fabricated or custom to sizes required; mitered, welded corners; concealed fasteners to match exterior insulated panel color.
      1. Configuration: Fascia, cant, and edge securement for roof membrane;
      2. Pull-Off Resistance: Tested in accordance with SPRI ES-1 RE-1 and RE-2 to positive and negative design wind pressure as defined by applicable code.
3. Color: As shown on drawings to match insulated panel color.

B. Copings: Factory fabricated to sizes required; mitered, welded corners; concealed fasteners.
   1. Configuration: Concealed continuous hold down cleat at both legs; internal splice piece at joints of same material, thickness and finish as cap; concealed stainless steel fasteners.
   2. Pull-Off Resistance: Tested in accordance with SPRI ES-1 RE-3 to positive and negative design wind pressure as defined by applicable code.
   3. Material: Formed aluminum sheet, 0.050 inch (1.3 mm) thick, minimum.

C. Control and Expansion Joint Covers: Composite construction 2 inch wide flexible EPDM flashing of white color with closed cell urethane foam backing, each edge seamed to aluminum sheet metal flanges, designed for nominal joint width of 1 inch (25 mm). Include special formed corners, tees, intersections, and wall flashings, each sealed watertight.

D. Pipe and Penetration Flashing: Base of rounded aluminium, compatible with sheet metal roof systems, and capable of accommodating pipes sized between 0.375 inches (9.5 mm) and 12 inches (30.5 cm).
   1. Caps: EPDM.
   2. Color: As shown on drawings.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.

3.02 INSTALLATION
   A. Install components in accordance with manufacturer's instructions.

END OF SECTION
SECTION 07 8400

FIRESTOPPING

PART 2 PRODUCTS

1.01 FIRESTOPPING - GENERAL REQUIREMENTS
   A. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

1.02 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS
   A. Blank Openings:
      1. 1 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.

1.03 FIRESTOPPING SYSTEMS
   A. Firestopping: Any material meeting requirements.
      1. Fire Ratings: Use any system listed by UL or tested in accordance with ASTM E814 that has F Rating equal to fire rating of penetrated assembly and T Rating Equal to F Rating and that meets all other specified requirements.

PART 3 EXECUTION

2.01 INSTALLATION
   A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

END OF SECTION
SECTION 07 9005
JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Sealants and joint backing.

1.02 RELATED REQUIREMENTS
A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
B. Section 07 2500 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders:
C. Section 08 6300 - Metal-Framed Skylights: Structural and weatherseal sealants and accessories.

1.03 REFERENCE STANDARDS

1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordinate the work with other sections referencing this section.

1.05 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.06 FIELD CONDITIONS
A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.07 WARRANTY
A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
B. Correct defective work within a five year period after Date of Substantial Completion.
C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Silicone Sealants:
   5. Substitutions: See Section 01 6000 - Product Requirements.
B. Polyurethane Sealants:
2. BASF Construction Chemicals-Building Systems; Product ____:
3. Sherwin-Williams Company; Stampede-1/-TX Polyurethane Sealant:
4. Substitutions: See Section 01 6000 - Product Requirements.

C. Butyl Sealants:
   4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 SEALANTS

A. Sealants and Primers - General: Provide products having volatile organic compound (VOC) content as specified in Section 01 6116.

2.03 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
B. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
C. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.
B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.
B. Clean and prime joints in accordance with manufacturer's instructions.
C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
B. Perform installation in accordance with ASTM C1193.
C. Install bond breaker where joint backing is not used.
D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
F. Tool joints concave.

3.04 CLEANING

A. Clean adjacent soiled surfaces.
3.05 PROTECTION

A. Protect sealants until cured.

END OF SECTION
SECTION 08 1113
HOLLOW METAL DOORS AND FRAMES

PART 1  GENERAL

1.01 SECTION INCLUDES
A. Non-fire-rated steel doors and frames.
B. Steel frames for wood doors.

1.02 RELATED REQUIREMENTS
A. Section 08 7100 - Door Hardware.
B. Section 08 8000 - Glazing: Glass for doors and borrowed lites.

1.03 REFERENCE STANDARDS
E. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2006.

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements for submittal procedures.
B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.
C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

1.05 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
B. Maintain at the project site a copy of all reference standards dealing with installation.

1.06 DELIVERY, STORAGE, AND HANDLING
A. Store in accordance with NAAMM HMMA 840.
B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2  PRODUCTS

2.01 MANUFACTURERS
A. Steel Doors and Frames:
   5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS AND FRAMES

A. Requirements for All Doors and Frames:
   2. Door Top Closures: Flush with top of faces and edges.
   3. Door Edge Profile: Beveled on both edges.
   5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
   6. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
   7. Finish: Factory primed, for field finishing.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 STEEL FRAMES

A. General:
   1. Comply with the requirements of grade specified for corresponding door, except:
      a. ANSI A250.8 Level 1 Doors: 16 gage frames.
      b. Frames for Wood Doors: Comply with frame requirements specified in ANSI A250.8 for Level 1, 16 gage
   2. Finish: Same as for door.
   3. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.

B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.04 ACCESSORY MATERIALS

A. Glazing: As specified in Section 08 8000, factory installed.

B. Grout for Frames: Portland cement grout of maximum 4-inch slump for hand troweling; thinner pumpable grout is prohibited.

C. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.

D. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.05 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.
3.02 INSTALLATION
   A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.
   B. Coordinate frame anchor placement with wall construction.
   C. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
   D. Coordinate installation of hardware.
   E. Coordinate installation of glazing.

3.03 TOLERANCES
   A. Maximum Diagonal Distortion: 1/16 in (1.5 mm) measured with straight edge, corner to corner.

3.04 ADJUSTING
   A. Adjust for smooth and balanced door movement.

END OF SECTION
SECTION 08 1416

FLUSH WOOD DOORS

PART 1 GENERAL

1.01 REFERENCE STANDARDS
   B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2009.

1.02 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements for submittal procedures.
   B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
   C. Specimen warranty.
   D. Samples: Submit two samples of door construction, in size cut from top corner of door.
   E. Manufacturer's Installation Instructions: Indicate special installation instructions.
   F. Warranty, executed in Owner's name.

1.03 QUALITY ASSURANCE
   A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.
   B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
   C. Installed Fire Rated Door and Transom Panel Assembly: Conform to NFPA 80 for fire rated class as indicated.

1.04 DELIVERY, STORAGE, AND HANDLING
   A. Package, deliver and store doors in accordance with specified quality standard.
   B. Accept doors on site in manufacturer's packaging. Inspect for damage.
   C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.05 WARRANTY
   A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.
   B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
   C. Include coverage for delamination of veneer, warping beyond specified installation tolerances,
defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Wood Veneer Faced Doors:
   4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS AND PANELS

A. All Doors: See drawings for locations and additional requirements.
   1. Quality Level: Premium Grade, in accordance with AWI/AWMAC/WH Architectural Woodwork Standards.

B. Interior Doors: 1-3/4 inches (44 mm) thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at all locations.
   2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with NFPA 252, UL 10B, or UBC Standard 7-2-94 ("neutral pressure"); UL or WH (ITS) labeled without any visible seals when door is open.

2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated above.

B. Fire Rated Doors: Mineral core, Type FD, plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.04 DOOR FACINGS

A. Wood Veneer Facing for Transparent Finish: Species as specified above, veneer grade as specified by quality standard, plain sliced, book veneer match, running assembly match; unless otherwise indicated.
   1. Vertical Edges: Any option allowed by quality standard for grade.
   2. Pairs: Pair match each pair; set match pairs within 10 feet (3 m) of each other when doors are closed.

B. Hardboard Facing for Opaque Finish: AHA A135.4, Class 1 - Tempered, S2S (smooth two sides) hardboard, composition face, 1/8 inch (3 mm) thick.

2.05 DOOR CONSTRUCTION

A. Fabricate doors in accordance with door quality standard specified.

B. Cores Constructed with stiles and rails:

C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
   1. Exception: Doors to be field finished.

E. Provide edge clearances in accordance with the quality standard specified.

PART 3 EXECUTION

3.01 INSTALLATION
A. Install doors in accordance with manufacturer's instructions and specified quality standard.
B. Use machine tools to cut or drill for hardware.
C. Coordinate installation of doors with installation of frames and hardware.

END OF SECTION
SECTION 08 7100

DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for hollow steel doors.
B. Hardware for fire-rated doors.
C. Lock cylinders for doors for which hardware is specified in other sections.
D. Thresholds.
E. Weatherstripping, seals and door gaskets.

1.02 RELATED REQUIREMENTS

A. Section 08 1113 - Hollow Metal Doors and Frames.
B. Section 08 3613 - Sectional Doors: Hardware for same, except cylinders; installation of cylinders.

1.03 PRICE AND PAYMENT PROCEDURES

A. See Section 01 2100 - Allowances, for allowances affecting this section.

1.04 REFERENCE STANDARDS

C. BHMA A156.1 - American National Standard for Butts and Hinges; Builders Hardware Manufacturers Association, Inc.; 2006 (ANSI/BHMA A156.1).
D. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches; Builders Hardware Manufacturers Association; 2011 (ANSI/BHMA A156.2).
E. BHMA A156.3 - American National Standard for Exit Devices; Builders Hardware Manufacturers Association; 2008 (ANSI/BHMA A156.3).
F. BHMA A156.4 - American National Standard for Door Controls - Closers; Builders Hardware Manufacturers Association, Inc.; 2008 (ANSI/BHMA A156.4).
G. BHMA A156.6 - American National Standard for Architectural Door Trim; Builders Hardware Manufacturers Association; 2010 (ANSI/BHMA A156.6).
H. BHMA A156.8 - American National Standard for Door Controls - Overhead Stops and Holders; Builders Hardware Manufacturers Association, Inc.; 2010 (ANSI/BHMA A156.8).
I. BHMA A156.18 - American National Standard for Materials and Finishes; Builders Hardware Manufacturers Association, Inc.; 2006 (ANSI/BHMA A156.18).
J. DHI (LOCS) - Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames; Door and Hardware Institute; 2004.
1.05 ADMINISTRATIVE REQUIREMENTS
   A. Coordinate the manufacture, fabrication, and installation of products onto which door hardware will be installed.
   B. Convey Owner’s keying requirements to manufacturers.
   C. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section; require attendance by all affected installers.

1.06 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Product Data: Manufacturer’s catalog literature for each type of hardware, marked to clearly show products to be furnished for this project.
   C. Hardware Schedule: Detailed listing of each item of hardware to be installed on each door. Use door numbering scheme as included in the Contract Documents. Identify electrically operated items and include power requirements.
   D. Keying Schedule: Submit for approval of Owner.
   E. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.
   F. Warranty: Submit manufacturer’s warranty and ensure that forms have been completed in Owner’s name and registered with manufacturer.

1.07 QUALITY ASSURANCE
   A. Hardware Supplier Qualifications: Company specializing in supplying commercial door hardware with Five years of experience.

1.08 DELIVERY, STORAGE, AND HANDLING
   A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.09 WARRANTY
   A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 DOOR HARDWARE - GENERAL
   A. Provide all hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.
   B. Provide all items of a single type of the same model by the same manufacturer.
   C. Provide products that comply with the following:
      1. Applicable provisions of federal, state, and local codes.
      2. ADA Standards for Accessible Design.
      5. All Hardware on Fire-Rated Doors: Listed and classified by UL as suitable for the purpose specified and indicated.
      6. Hardware for Smoke and Draft Control Doors (Indicated as "S" on Drawings): Provide hardware that enables door assembly to comply with air leakage requirements of the applicable code.
D. Function: Lock and latch function numbers and descriptions of manufactures series as listed in hardware schedule.

E. Finishes: All door hardware the same finish unless otherwise indicated.
   1. Primary Finish: Satin chrome plated over nickel on brass or bronze, 626 (approx US26D).
   2. Secondary Finish: Satin chrome plated over nickel on brass or bronze, 626 (approx US26D).
      a. Use secondary finish in kitchens, bathrooms, and other spaces containing chrome or stainless steel finished appliances, fittings, and equipment; provide primary finish on one side of door and secondary finish on other side if necessary.
   3. Finish Definitions: BHMA A156.18.
   4. Exceptions:
      a. Where base metal is specified to be different, provide finish that is an appearance equivalent according to BHMA A156.18.
      c. Door Closer Covers and Arms: Color to be selected by Architect from manufacturer's standard colors.
      d. Aluminum Surface Trim and Gasket Housings: Anodized to match door, not to match other hardware.

F. Fasteners:
   1. Concrete and Masonry Substrates: Stainless steel machine screws and lead expansion shields.

2.02 HINGES

A. Hinges: Provide hinges on every swinging door.
   1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
   2. Provide ball-bearing hinges at all doors having closers.
   3. Provide hinges in the quantities indicated.
   4. Provide non-removable pins on exterior outswinging doors.
   5. Where electrified hardware is mounted in door leaf, provide power transfer hinges.

B. Quantity of Hinges Per Door:
   1. Doors From 60 inches (1.5 m) High up to 90 inches (2.3 m) High: Three hinges.
   2. Doors over 120 inches (3 m) High: One additional hinge per each additional 30 inches (762 mm) in height unless specified otherwise.

C. Manufacturers - Hinges:
   5. Substitutions: See Section 01 6000 - Product Requirements.

2.03 PUSH/PULLS

A. Push/Pulls: Comply with BHMA A156.6.
   1. Provide push and pull on doors not specified to have lockset, latchset, exit device, or auxiliary lock.
   2. On solid doors, provide matching push plate and pull plate on opposite faces.

B. Manufacturers - Push/Pulls:
   4. Substitutions: See Section 01 6000 - Product Requirements.
2.04 LOCKS AND LATCHES

A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
   1. Hardware Sets indicate locking functions required for each door.
   2. If no hardware set is indicated for a swinging door provide an office lockset.
   3. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
   4. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.

B. Lock Cylinders: Manufacturer's standard tumbler type, six-pin standard core.
   1. Provide cams and/or tailpieces as required for locking devices required.

C. Keying: Grand master keyed.
   1. Key to existing keying system.

D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

2.05 CYLINDRICAL LOCKSETS

A. Locking Functions: As defined in BHMA A156.2, and as follows:
   1. Always-Locked: F86, key required to lock, may not be left unlocked.

B. Manufacturers - Cylindrical Locksets:
   5. Substitutions: See Section 01 6000 - Product Requirements.

2.06 FLUSHBOLTS

A. Flushbolts: Lever extension bolts in leading edge of door, one bolt into floor, one bolt into top of frame.
   1. Pairs of Swing Doors: At inactive leaves, provide flush bolts of type as required to comply with code.
   2. Floor Bolts: Provide dustproof strike except at metal thresholds.

B. Self-Latching Flushbolts: Automatically latch upon closing of door; manually retracted.

C. Coordinators: Provide on doors having closers and self-latching or automatic flushbolts to ensure that leaves close in proper order.

D. Manufacturers - Flushbolts:
   4. Substitutions: See Section 01 6000 - Product Requirements.

2.07 EXIT DEVICES

A. Locking Functions: Functions as defined in BHMA A156.3, and as follows:
   1. Entry/Exit, Always-Latched: Key outside locks and unlocks lever, no latch holdback (dogging).

B. Manufacturers:
4. Substitutions: See Section 01 6000 - Product Requirements.

2.08 CLOSERS
A. Closers: Complying with BHMA A156.4.
   1. Provide surface-mounted, door-mounted closers unless otherwise indicated.
   2. Provide a door closer on every exterior door.
   3. Provide a door closer on every fire- and smoke-rated door. Spring hinges are not an acceptable self-closing device unless specifically so indicated.
   4. On pairs of swinging doors, if an overlapping astragal is present, provide coordinator to ensure the leaves close in proper order.
   5. At outswinging exterior doors, mount closer in inside of door.

B. Manufacturers - Closers:
   4. Substitutions: See Section 01 6000 - Product Requirements.

2.09 STOPS AND HOLDERS
A. Stops: Complying with BHMA A156.8; provide a stop for every swinging door, unless otherwise indicated.
   1. Provide wall stops, unless otherwise indicated.
   2. If wall stops are not practical, due to configuration of room or furnishings, provide overhead stop.
   3. Stop is not required if positive stop feature is specified for door closer; positive stop feature of door closer is not an acceptable substitute for a stop unless specifically so stated.

B. Wall Stops:

C. Manufacturers - Wall and Floor Stops/ Holders:
   3. Substitutions: See Section 01 6000 - Product Requirements.

2.10 GASKETING AND THRESHOLDS
A. Thresholds:
   1. At each exterior door, provide a threshold unless otherwise indicated.
   2. Field cut threshold to frame for tight fit.

B. Fasteners At Exterior Locations: Non-corroding.

C. Manufacturers - Gasketing and Thresholds:
   4. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.

3.02 INSTALLATION
A. Install hardware in accordance with manufacturer's instructions and applicable codes.
B. Use templates provided by hardware item manufacturer.
C. Install hardware on fire-rated doors and frames in accordance with code and NFPA 80.
D. Mounting heights for hardware from finished floor to center line of hardware item: As listed in Schedule, unless otherwise noted:
   1. For steel doors and frames: Comply with DHI “Recommended Locations for Architectural Hardware for Steel Doors and Frames.”
   2. For steel doors and frames: See Section 08 1113.

3.03 FIELD QUALITY CONTROL
   A. Field inspection and testing will be performed under provisions of Section 01 4000.

3.04 ADJUSTING
   A. Adjust work under provisions of Section 01 7000.
   B. Adjust hardware for smooth operation.

3.05 CLEANING
   A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.06 PROTECTION
   A. Protect finished Work under provisions of Section 01 7000.
   B. Do not permit adjacent work to damage hardware or finish.

END OF SECTION
SECTION 08 8000
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Glass.

1.02 RELATED REQUIREMENTS
   A. Section 07 2500 - Weather Barriers.
   B. Section 07 9005 - Joint Sealers: Sealant and back-up material.
   C. Section 08 1113 - Hollow Metal Doors and Frames: Glazed doors and borrowed lites.
   D. Section 08 3613 - Sectional Doors: Glazed lites in doors.

1.03 REFERENCE STANDARDS
   F. GANA (GM) - GANA Glazing Manual; Glass Association of North America; 2009.
   G. GANA (SM) - GANA Sealant Manual; Glass Association of North America; 2008.

1.04 SUBMITTALS
   A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
   B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

1.05 QUALITY ASSURANCE
   B. Installer Qualifications: Company specializing in performing the work of this section with minimum __________ years documented experience.

1.06 FIELD CONDITIONS
   A. Do not install glazing when ambient temperature is less than 50 degrees F (10 degrees C).
   B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.07 WARRANTY
   A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

GLAZING
2.01 GLAZING TYPES
A. Type IG-1 - Sealed Insulating Glass Units: Vision glazing.
   1. Application(s): All exterior glazing unless otherwise indicated.
   2. Outboard Lite: Fully tempered float glass, 1/4 inch (6 mm) thick, minimum.
      a. Tint: Clear.
   3. Inboard Lite: Annealed float glass, 1/4 inch (6 mm) thick, minimum.
      a. Tint: Clear.
   4. Total Thickness: 1 inch (25 mm).

2.02 EXTERIOR GLAZING ASSEMBLIES
A. Structural Design Criteria: Select type and thickness to withstand dead loads and wind loads
   acting normal to plane of glass at design pressures calculated in accordance with ________
   code.
   1. Use the procedure specified in ASTM E1300 to determine glass type and thickness.
   2. Limit glass deflection to 1/200 or flexure limit of glass, whichever is less, with full recovery
      of glazing materials.
   3. Thicknesses listed are minimum.
B. Air and Vapor Seals: Provide completed assemblies that maintain continuity of building
   enclosure vapor retarder and air barrier:
   1. In conjunction with vapor retarder and joint sealer materials described in other sections.
   2. To maintain a continuous air barrier and vapor retarder throughout the glazed assembly
      from glass pane to heel bead of glazing sealant.

2.03 GLASS MATERIALS
A. Float Glass Manufacturers:
   4. Substitutions: Refer to Section 01 6000 - Product Requirements.
B. Float Glass: All glazing is to be float glass unless otherwise indicated.

2.04 SEALED INSULATING GLASS UNITS
A. Manufacturers:
   1. Any of the manufacturers specified for float glass.
   2. Substitutions: Refer to Section 01 6000 - Product Requirements.
B. Sealed Insulating Glass Units: Types as indicated.
   1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
   2. Edge Spacers: Aluminum, bent and soldered corners.
   3. Edge Seal: Glass to elastomer with supplementary silicone sealant.
   4. Purge interpane space with dry hermetic air.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that openings for glazing are correctly sized and within tolerance.
B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may
   impede moisture movement, weeps are clear, and ready to receive glazing.

3.02 PREPARATION
A. Clean contact surfaces with solvent and wipe dry.
B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

3.03 MANUFACTURER’S FIELD SERVICES
A. Glass and Glazing product manufacturers to provide field surveillance of the installation of their products.
B. Monitor and report installation procedures and unacceptable conditions.

3.04 CLEANING
A. Remove glazing materials from finish surfaces.
B. Remove labels after Work is complete.
C. Clean glass and adjacent surfaces.

3.05 PROTECTION
A. After installation, mark pane with an ‘X’ by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

3.06 SCHEDULE
A. Hollow Steel Frames - Interior: Interior wet method with Type [___] compound.
   1. Fire-rated openings: Wired glass, 6 mm thick.

END OF SECTION
SECTION 09 2116

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.
B. Metal stud wall framing.
C. Acoustic insulation.
D. Gypsum sheathing.
E. Gypsum wallboard.
F. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

A. Section 05 4000 - Cold-Formed Metal Framing: Exterior wind-load-bearing metal stud framing.
B. Section 07 2500 - Weather Barriers: Water-resistive barrier over sheathing.

1.03 REFERENCE STANDARDS

F. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2011.
L. ASTM E413 - Classification for Rating Sound Insulation; 2010.
M. GA-216 - Application and Finishing of Gypsum Board; Gypsum Association; 2010.
PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies complying with ASTM C840 and GA-216.

B. Interior Partitions Indicated as Acoustic: Provide completed assemblies with the following characteristics:
   1. Acoustic Attenuation: STC of 45-49 calculated in accordance with ASTM E413, based on tests conducted in accordance with ASTM E90.

C. Fire Rated Assemblies: Provide completed assemblies with the following characteristics:
   1. Fire Rated Partitions: UL listed assembly No. _____; _____ hour rating.
   2. UL Assembly Numbers: Provide construction equivalent to that listed for the particular assembly in the current UL Fire Resistance Directory.

2.02 METAL FRAMING MATERIALS

A. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf (240 Pa).
   1. Studs: "C" shaped with flat or formed webs with knurled faces.
   2. Runners: U shaped, sized to match studs.

2.03 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
   2. Thickness:
      a. Vertical Surfaces: 5/8 inch (16 mm).

C. Impact-Rated Wallboard: Tested to Level 3 soft-body and hard-body impact in accordance with ASTM C1629.
   1. Application: High-traffic areas indicated.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   3. Type: Fire-resistance rated Type X, UL or WH listed.
   4. Thickness: 5/8 inch (16 mm).
   5. Edges: Tapered.

D. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
   1. Application: Exterior sheathing, unless otherwise indicated.
   2. Edges: Square, for vertical application.

2.04 ACCESSORIES

A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: ____ inch (____ mm).

B. Water-Resistive Barrier: As specified in Section 07 2500.

C. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.

D. Screws for Attachment to Steel Members Less Than 0.03 inch (0.7 mm) In Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type; cadmium-plated for
E. Screws for Attachment to Steel Members From 0.033 to 0.112 inch (0.8 to 2.8 mm) in Thickness: ASTM C954; steel drill screws for application of gypsum board to loadbearing steel studs.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION
A. Metal Framing: Install in accordance with ASTM C754 and manufacturer’s instructions.
B. Studs: Space studs as permitted by standard.
   1. Extend partition framing to structure where indicated and to ceiling in other locations.
   2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer’s instructions.

3.03 ACOUSTIC ACCESSORIES INSTALLATION
A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
B. Acoustic Sealant: Install in accordance with manufacturer’s instructions.

3.04 BOARD INSTALLATION
A. Comply with ASTM C 840, GA-216, and manufacturer’s instructions. Install to minimize butt end joints, especially in highly visible locations.
B. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

3.05 JOINT TREATMENT
A. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
   2. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.
B. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).

END OF SECTION
SECTION 09 5100

ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Suspended metal grid ceiling system.
   B. Acoustical units.

1.02 REFERENCE STANDARDS
   A. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2008e1.

1.03 QUALITY ASSURANCE
   A. Fire-Resistive Assemblies: Complete assembly listed and classified by UL for the fire resistance indicated.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS
   A. Acoustical Units - General: ASTM E1264, Class A.
      1. Units for Installation in Fire-Rated Suspension System: Listed and classified for the fire-resistant assembly the suspension system is a part of.

PART 3 EXECUTION

3.01 INSTALLATION - SUSPENSION SYSTEM
   A. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
   B. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
   C. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
   D. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
   E. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
   F. Support fixture loads using supplementary hangers located within 6 inches (150 mm) of each corner, or support components independently.
   G. Do not eccentrically load system or induce rotation of runners.

3.02 INSTALLATION - ACOUSTICAL UNITS
   A. Install acoustical units in accordance with manufacturer's instructions.
   B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
   C. Lay directional patterned units with pattern parallel to longest room axis.
   D. Fit border trim neatly against abutting surfaces.
E. Install units after above-ceiling work is complete.

F. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

G. Cutting Acoustical Units:
   1. Make field cut edges of same profile as factory edges.

H. Install hold-down clips on each panel to retain panels tight to grid system; comply with fire rating requirements.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
A. Resilient sheet flooring.
B. Installation accessories.

1.02 RELATED REQUIREMENTS
A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Verification Samples: Submit two samples, in size illustrating color and pattern for each resilient flooring product specified.

PART 2 PRODUCTS

2.01 SHEET FLOORING
A. Vinyl Sheet Flooring Type _____: Homogeneous without backing, with color and pattern throughout full thickness, and:
   1. Minimum Requirements: Comply with ASTM F1303, Type II, without backing, or ASTM F1913.
   2. Total Thickness and Wear Layer Thickness: 0.080 inch (2.0 mm) nominal.
   3. Heat welded seams.
B. Vinyl Welding Rod: Solid vinyl bead produced by manufacturer of vinyl flooring for heat welding seams, in color matching field color.

2.02 ACCESSORIES

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.
B. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.
   1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

3.02 INSTALLATION
A. Starting installation constitutes acceptance of sub-floor conditions.
B. Install in accordance with manufacturer's instructions.
C. Spread only enough adhesive to permit installation of materials before initial set.
D. Fit joints tightly.
E. Set flooring in place, press with heavy roller to attain full adhesion.
F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.03 SHEET FLOORING

A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns carefully at seams.
B. Seams are prohibited in bathrooms, kitchens, toilet rooms, and custodial closets.
C. Double cut sheet at seams.
D. Lay flooring with tightly butted seams, without any seam sealer unless otherwise indicated.
E. Finish seams in sheet vinyl Type ____ by heat welding.

END OF SECTION
SECTION 09 6813

TILE CARPETING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Carpet tile, fully adhered.

1.02 RELATED REQUIREMENTS
A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
B. Section 01 7419 - Construction Waste Management and Disposal: Reclamation/Recycling of new carpet tile scrap.

1.03 REFERENCE STANDARDS
B. CRI (CIS) - Carpet Installation Standard; Carpet and Rug Institute; 2009.

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

1.05 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.

1.06 FIELD CONDITIONS
A. Store materials in area of installation for minimum period of 24 hours prior to installation.

PART 2 PRODUCTS

2.01 MATERIALS
A. Carpet Tile Type ____: Tufted, manufactured in one color dye lot.

PART 3 EXECUTION

3.01 EXAMINATION
A. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for flooring installation by testing for moisture and pH.
   1. Obtain instructions if test results are not within limits recommended by flooring material manufacturer and adhesive materials manufacturer.

3.02 PREPARATION
A. Prepare floor substrates for installation of flooring in accordance with Section 09 0561.

3.03 INSTALLATION
A. Starting installation constitutes acceptance of sub-floor conditions.
B. Install carpet tile in accordance with manufacturer's instructions and CRI Carpet Installation Standard.
C. Blend carpet from different cartons to ensure minimal variation in color match.
D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.
E. Lay carpet tile in square pattern, with pile direction parallel to next unit, set parallel to building lines.

F. Fully adhere carpet tile to substrate.

G. Trim carpet tile neatly at walls and around interruptions.

H. Complete installation of edge strips, concealing exposed edges.

END OF SECTION
SECTION 09 9000
PAINTING AND COATING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints, stains, varnishes, and other coatings.

C. Scope: Finish all interior and exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
   2. Mechanical and Electrical:
      a. In finished areas, paint all conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.

D. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Floors, unless specifically so indicated.
   7. Concealed pipes, ducts, and conduits.

1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 05 5000 - Metal Fabrications: Shop-primed items.

C. Section 05 5100 - Metal Stairs: Shop-primed items.

1.03 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS


1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of all products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category
(e.g. "alkyd enamel").
2. MPI product number (e.g. MPI #47).
3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.08 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
C. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
B. Paints:
C. Primer Sealers: Same manufacturer as top coats.
D. Block Fillers: Same manufacturer as top coats.
E. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
   1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Supply each coating material in quantity required to complete entire project's work from a single production run.
   3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.

C. Volatile Organic Compound (VOC) Content:
   1. Provide coatings that comply with the most stringent requirements specified in the following:
   2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

E. Colors: As indicated on drawings
   1. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

2.03 PAINT SYSTEMS - EXTERIOR

A. Paint EC-OP - All Exterior Concrete and Masonry Surfaces Indicated to be Painted, Unless Otherwise Indicated: Including concrete, concrete masonry, brick, cement board, and _____.
   1. Preparation as specified by manufacturer.
   2. Two top coats and one coat primer recommended by manufacturer.
   3. Primer On Concrete and Concrete Masonry: One heavy coat latex block filler (100 percent acrylic) squeegeed into pores.

B. Paint CE-OP-3L - Masonry/Concrete, Opaque, Latex, 3 Coat:
   1. One coat of block filler.
   2. Semi-gloss: Two coats of latex enamel; ____.

C. Paint ME-OP-3L - Ferrous Metals, Unprimed, Latex, 3 Coat:
   1. One coat of latex primer.
   2. Gloss: Two coats of latex enamel; ____.

D. Paint ME-OP-2A - Ferrous Metals, Primed, Alkyd, 2 Coat:
   1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
   2. Gloss: Two coats of alkyd enamel; ____.

E. Paint ME-OP-2L - Ferrous Metals, Primed, Latex, 2 Coat:
   1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
   2. Gloss: Two coats of latex enamel; ____.

F. Paint MgE-OP-3L - Galvanized Metals, Latex, 3 Coat:
   1. One coat galvanize primer.
   2. Gloss: Two coats of latex enamel; ____.

G. Paint E-Pav - Pavement Marking Paint:
   1. Yellow: One coat, with reflective particles; to match existing.

2.04 PAINT SYSTEMS - INTERIOR

A. Paint I-OP - All Interior Surfaces Indicated to be Painted, Unless Otherwise Indicated: Including concrete masonry, uncoated steel, shop primed steel, and galvanized steel.
   1. Two top coats and one coat primer.
   2. Top Coat(s): MPI Institutional Low Odor/VOC Interior Latex; MPI #143-148.
   3. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
   4. Primer(s): As follows unless other primer is required or recommended by manufacturer of top coats:
a. All Substrates: MPI #149, Institutional Low Odor/VOC Primer Sealer, unless a different primer is specified.
b. Concrete Masonry: MPI #4, Latex Block Filler; heavy coat squeegeed into pores.
c. Steel, Uncoated: MPI #107, Rust-Inhibitive Water Based Primer.
d. Steel -- Shop Primer: MPI #76, Quick Dry Alkyd Primer for Metal.
e. Galvanized Steel: MPI #134, Water Based Galvanized Primer.

B. Paint I-OP-MD-DT - Medium Duty Door/Trim: For surfaces subject to frequent contact by occupants, including metals:
   1. Two top coats and one coat primer.
   2. Top Coat(s): MPI Interior Epoxy-Modified Latex; MPI #115, 215.
   3. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
   4. Primer(s): As recommended by manufacturer of top coats.

C. Paint I-OP-DF - Dry Fall: Metals; exposed structure and overhead-mounted services in utilitarian spaces, including shop primed steel deck, structural steel, and metal fabrications.
   1. Shop primer by others.
   2. One top coat; white.
   3. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of coatings until substrates have been properly prepared.

B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

D. Test shop-applied primer for compatibility with subsequent cover materials.

E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
   2. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
   3. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.
   4. Concrete Floors and Traffic Surfaces: 8 percent.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.
E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

G. Aluminum Surfaces to be Painted: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.

H. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

I. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-PC 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).

J. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand or power tool wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.

K. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.

L. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.

3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.

C. Apply products in accordance with manufacturer's instructions.

D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

E. Apply each coat to uniform appearance.

F. Sand wood and metal surfaces lightly between coats to achieve required finish.

G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

H. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.

3.05 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and
remove daily from site.

3.06 PROTECTION
   A. Protect finished coatings until completion of project.
   B. Touch-up damaged coatings after Substantial Completion.

3.07 SCHEDULE - PAINT SYSTEMS
   A. Concrete, Concrete Block, Brick Masonry: Finish all surfaces exposed to view.
   B. Steel Doors and Frames: Finish all surfaces exposed to view; MI-OP-3A, gloss.
   C. Steel Fabrications: Finish all surfaces exposed to view.
   D. Shop-Primed Metal Items: Finish all surfaces exposed to view.

3.08 SCHEDULE - COLORS
   A. Doors and frames to match interior surface of exterior insulated metal panels.
   B. CMU walls to be SW 6804 Dignity Blue provide mockup sample on wall for Owner approval prior to installation.

END OF SECTION
SECTION 10 4400

FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Fire extinguishers.
B. Fire extinguisher cabinets.

1.02 RELATED REQUIREMENTS
A. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide extinguisher operational features.
C. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

1.05 FIELD CONDITIONS
A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Fire Extinguishers:
B. Fire Extinguisher Cabinets and Accessories:
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FIRE EXTINGUISHERS
A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
   1. Provide extinguishers labeled by UL for the purpose specified and indicated.
B. FE-36 Type Fire Extinguishers: Stainless steel tank, with pressure gage.
   1. Class: A:B:C.
   2. Size: 10 pound (4.54 kg).
   3. Size and classification as scheduled.
   4. Finish: Baked polyester powder coat, ____ color.
   5. Temperature range: -40 degrees F (-40 degrees C) to 120 degrees F (49 degrees C).

2.03 FIRE EXTINGUISHER CABINETS
A. Metal: Formed primed steel sheet; 0.036 inch (0.9 mm) thick base metal.
B. Cabinet Configuration: Surface type.
   1. Sized to accommodate accessories.

C. Door: 0.036 inch (0.9 mm) thick, reinforced for flatness and rigidity; lock with break glass access. Hinge doors for 180 degree opening with two butt hinge. Provide nylon catch.

D. Cabinet Mounting Hardware: Appropriate to cabinet. Pre-drill for anchors.

E. Finish of Cabinet Interior: White enamel.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify rough openings for cabinet are correctly sized and located.

3.02 INSTALLATION

A. Install in accordance with manufacturer’s instructions.

B. Install cabinets plumb and level in wall openings, _____ inches (____ mm) from finished floor to inside bottom of cabinet.

C. Secure rigidly in place.

D. Place extinguishers and accessories in cabinets.

END OF SECTION
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SECTION 22 00 00

PLUMBING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Description of Plumbing system(s), quality expectations, materials and general requirements.

1.02 SYSTEM(S) DESCRIPTION

A. Plumbing systems of this contract shall include:
1. System of sanitary waste and vent from each fixture to points of connection as indicated on the Plumbing drawings.
2. Systems of hot and cold water distribution to all fixtures from mains where indicated.
3. Fixtures as specified and/or indicated.
4. Thermal insulation for all systems.
5. Testing and adjusting of all systems.
6. General Conditions of the contract.

1.03 RELATED DIVISIONS and SECTIONS

A. DIVISION 00 - Procurement and Contracting Requirements
B. DIVISION 01 - General Requirements
C. DIVISION 02 - Existing Conditions
D. DIVISION 07 - Thermal and Moisture Protection
E. DIVISION 21 - Fire Suppression
F. DIVISION 23 - Heating, Ventilating and Air-Conditioning (HVAC)
G. DIVISION 25 - Integrated Automation
H. DIVISION 26 - Electrical

1.03 REFERENCES

A. 2009 International Building Code
C. New Hampshire State Fire Code
D. 2009 NFPA 1, National Fire Code, as adopted and amended by NH State Fire Code

E. 2009 International Plumbing Code with NH amendments.

F. 2009 International Mechanical Code

G. 2009 International Energy Conservation Code

H. 2008 NFPA 70, National Electric Code

I. City of Manchester, New Hampshire ordinances, rules and regulations

J. Manchester Fire Department rules and regulations

K. All applicable ASTM Standards

1.04 SUBMITTALS

A. See SECTION 01 30 00 - Administrative Requirements, for submittal procedures.

END OF SECTION
SECTION 22 01 00

OPERATION AND MAINTENANCE OF PLUMBING

PART 1 GENERAL

1.01 INTENT

A. Furnish and install all plumbing work of this contract in accordance with governing codes and in a workmanlike manner.

B. The run and arrangement of all plumbing pipes shall be approximately as shown on the drawings and as directed during installation and shall be as straight and direct as possible, forming right angles or parallel lines with building walls and other pipes, and be neatly spaced.

C. Arrange work to avoid all interference with the work of all other trades. Consult with other contractors, and coordinate the location of their work with that of the others.

1.02 COLD WATER SYSTEMS

A. Cold water distribution systems shall supply water to all fixtures and other water consuming equipment and hot water heating equipment. Valved outlets for the use of other trades shall be furnished and installed complete.

1.03 GENERAL INSTALLATION OF PLUMBING PIPING

A. Offsets shall be permitted only where required to permit the pipes to follow walls, where standard fittings shall be used.

B. All risers shall be erected plumb and true and shall be parallel with walls and other pipes and be neatly spaced.

C. All roughing, underground or concealed in floors or wall construction, shall be installed before the construction is closed up.

D. Horizontal runs of piping, except where concealed in partitions, shall be kept as high up as possible and close to walls. Consult with other trades so that grouped lines shall not interfere with each other.

E. The arrangement, positions and connections of pipes, fixtures, drains and valves shown on the drawings shall be followed as closely as possible. However, the right is reserved by the Owner’s representative to change locations of pipes and associated specialties to accommodate any conditions which may arise during the progress of the work, without additional cost. The responsibility for accurately laying out the work rests with the contractor.

F. Piping shall be installed concealed in building construction in all finished areas.
   1. Special precaution shall be taken in the installation of piping concealed to see that the piping is properly installed. Should it be necessary to correct piping so
installed, this subcontractor shall be held liable for any injury caused to other work and the correction of piping.

G. Pipe shall not be bent, flattened or otherwise injured either before installation or during installation.

H. Connections to fixtures shown to be installed concealed in building construction shall, in general, be carried concealed to a point above floor at wall (near fixtures), where they shall break out and rise exposed to fixtures, all as required. Exposed waste and supplies (including in cabinets) shall be chrome, except for kitchen work sinks. The chrome tailpiece connection to plumbing roughed behind the cabinet shall be a threaded compression fitting with extended escutcheon.

I. Reducing fittings, unless otherwise approved in special cases, shall be used in making reduction in size of pipe. Bushing shall not be allowed unless specifically approved.

1.04 PLUMBING WATER PIPING CONSTRUCTION DETAILS

A. Pipe shall be supported as specified hereinafter.

B. Pipe lines shall be run parallel and spaced to permit proper covering.

C. Air chambers shall be Wade "Shok-Stop" or approved equal, and shall be installed on top of all hot and cold water risers on the upfeed system, on all individual hot and cold water fixture branch connections. Groups of fixtures may be served by one full branch sized air chamber.

D. Piping, fittings, valves, supports, hangers, etc., exposed to view shall be painted or chrome as directed. This provision shall apply to all piping from the point that it leaves the wall to the point of final connection to the fixture.

E. Any exposed piping and trim showing tool marks shall be removed and replaced with new materials without additional cost.

F. Riser control valves shall be provided on all risers. Drain valves shall be provided at the heel of each riser inside of shut-off valves.

G. Main shut-off valves shall be installed at each water connection at all tanks and other pieces of equipment.

H. Valves shall generally be provided on all main branches from risers to groups of fixtures and access doors shall be provided to all such valves not readily accessible.

I. Piping shall pitch to low points. All low points and any pockets caused by changes in elevation required by structural or other interferences shall be provided with drain valves.

J. Branches to individual fixtures shall be of sizes as shown in the Fixture Schedule on the drawings.
K. Vacuum breakers and backflow preventers shall be installed on all equipment and fixture connections as required by code and/or local ordinances.

L. Connections to equipment such as tanks, pumps, and the like, shall be made with flanged or union connections.

M. Where hot and cold water supply pipes connect to a combination supply fitting with a shut-off valve on its discharge, or the combination supply fitting is equipped with manual or thermostatic mixing valve, each hot and cold water supply pipe shall be equipped with a composition disc swing check valve ahead of the supply fitting.

1.05 SANITARY SEWER AND DRAINAGE SYSTEM

A. Complete system of sanitary sewer and drainage shall be provided. The system shall include all risers, branches with all pipes, fittings, hangers, anchors, plumbing fixtures, special fixture wasters, etc., to make the system complete.

B. Branch connections shall be made with "Wye" and long "Tee-Wye" fittings. All fittings shall conform to code requirements.
   1. Short 1/4 bends, common offsets and double hubs will not be permitted.
   2. Short "Tee-Wye" fittings are to be used in vertical piping only.

C. Drains shall be run at minimum grade of 1/8" per foot downward in the direction of flow unless otherwise indicated. Branch connections to stacks from fixtures shall pitch 1/4" per foot. Attention is called to the strict necessity of maintaining the ceiling heights posted on the architectural drawings.

1.06 VENT SYSTEMS

A. Complete systems of ventilating pipes shall be installed from the various new plumbing fixtures and other equipment to which drainage connections are made.
   1. Ventilating pipes shall be connected to the discharge of traps as shown.
   2. Carry vents individually to a point above the ultimate overflow level of the fixtures before connecting with any other vent pipe; in general, this will be approximately 42" above the finished floor.
   3. Branches shall be arranged to pitch back to fixtures.

B. Individual vent pipes shall be collected together in branch vent lines and connected to vent stacks in general, paralleling soil and waste stacks.
   1. Wherever possible, vent stack offsets shall be connected to adjacent soil stacks for the purpose of draining condensation.
   2. Where possible, the waste of a fixture shall be connected to the base of each vent stack for the purpose of washing out any scale or dirt which may accumulate.
   3. The soil stack may be used to wash out the heel of the vent.

END OF SECTION
SECTION 22 05 00

COMMON WORK RESULTS FOR PLUMBING

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Furnish all labor and materials to complete the installation of the plumbing systems as shown on the drawings, specified herein or both as follows:

1. System of sanitary waste and vent from each fixture to points of connection as indicated on the Plumbing drawings.
2. Systems of hot and cold water distribution to all fixtures from mains where indicated.
3. Fixtures as specified and/or indicated.
4. Thermal insulation for all systems.
5. Testing and adjusting of all systems.
6. General Conditions of the contract.

END OF SECTION
SECTION 22 05 23

GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 GENERAL

1.01 SCOPE

A. Provide shut-off valves to isolate sections of piping, every fixture and equipment. Valves shall be located at the inlet and outlet to permit removal for repairs without interfering with the remainder of the system.

B. Do not locate valves with stems below horizontal. Provide ball, check, balancing cocks, plus air vents and other type of valves as required for complete and proper valving of the entire installation, to control flow, shut-off, prevent backflow, provide drainage and control pressure and temperatures.

PART 2 PRODUCT

2.01 MATERIAL

A. Valves used for isolation and flow control in domestic water systems shall be bronze construction appropriate for potable water applications, equal to Watts LFB-6080.

B. Check valves 2½” and less shall be bronze horizontal swing check, 125 swp, equal to NIBCO T-413-B.

C. Drain valves to be installed at low points in piping and as otherwise required to completely drain piping system and equipment. Drain valves shall be ball valves of size as shown or required, in no case smaller than ½” I.P.S., equal to Watts B-6000-CC with ¾” male thread for hose, outlet with cap and chain.

END OF SECTION
SECTION 22 05 29

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SCOPE

A. Provide suitable and substantial hangers and supports for all horizontal and vertical lines as manufactured by B-Line, Allegheny Industrial, Tolco or ITT Grinnell.

B. Support copper, steel, cast iron and all other material piping in accordance with the pipe manufacturer’s published instructions, or the schedule below, whichever is more stringent.

C. Support piping in accordance with the following schedule:

<table>
<thead>
<tr>
<th>Pipe Material</th>
<th>Max. Horizontal Spacing</th>
<th>Max. Vertical Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper tubing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1¼” &amp; smaller</td>
<td>6’</td>
<td>10’</td>
</tr>
<tr>
<td>1½” &amp; larger</td>
<td>10’</td>
<td>10’</td>
</tr>
<tr>
<td>Steel pipe</td>
<td>12’</td>
<td>15’</td>
</tr>
<tr>
<td>Cast iron</td>
<td>At joint or 10’</td>
<td>At joint</td>
</tr>
<tr>
<td>PVC &amp; CPVC</td>
<td>As recommended by pipe manufacturer.</td>
<td></td>
</tr>
</tbody>
</table>

D. Piping and equipment shall not be hung from the work of other trades.

PART 2 PRODUCT

2.01 MATERIAL

A. Hangers shall be of heavy construction suitable for the size of pipe to be supported. All materials, except pipe rollers, shall be wrought or malleable iron or steel. Hangers shall be adjustable type.

B. Hangers and pipe clamps used on copper piping shall be solid copper or copper plated. Where tube is in contact with dissimilar metal, protect with shield or plastic cover.

C. The intention is to provide supports which in each case shall be amply strong and rigid for the load, but which shall not weaken or unduly stress the building construction.
D. For insulated piping $\geq 3\"$ provide teflon slide type supports MSS (Manufacturer’s Standardization Society) Type 35 or protective saddles MSS Type 39. Fill interior voids of saddles with segments of insulation to match adjoining pipe insulation.

E. For all insulated piping provide protective insulation shields MSS (Manufacturer’s Standardization Society) Type 40 as follows:

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Length</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{1}{4}&quot;$ to $3\frac{1}{2}&quot;$</td>
<td>12”</td>
<td>18 ga.</td>
</tr>
</tbody>
</table>

END OF SECTION
SECTION 22 05 53
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 GENERAL

A. Identification shall be provided on all piping that is exposed, as well as at all concealed locations such as shafts and above removable ceilings in which piping may be viewed.
   1. Furnish and affix approved adhesive bands identifying the service and direction of flow of the various piping systems.
   2. A set of such bands shall be affixed to each pipe not less than 30' and there shall be at least one set of identifying bands in every room where piping may be viewed.
   3. Each set shall consist of one band on which the name of the service is printed and one band on which is printed a black directional arrow.

B. Identification bands shall have adhesive backing. Submit same for approval.
   1. The name of the service shall be printed in black letters not less than 2" high for 3" pipe and larger; 1" high for pipe 2½" and smaller.
   2. Bands shall be applied where they can be read with their long dimension parallel to the axis of the pipe or duct. Bands shall be applied only after finish painting is completed.

1.02 SCOPE

A. Attach to each valve a 2” brass tag on which shall be stamped designating letters and numbers ½” high filled with black enamel. Letters designate service.
   1. The tags shall be securely fastened to the handle or spindle of the valve by a brass chain.
   2. Cross reference valve tags on the “As-Built” drawings and include schedules in the Operation & Maintenance (O&M) manuals.
   3. One (1) copy of the valve schedule shall be provided in the O&M Manual. Review numbering with the Owner’s representative prior to installation and honor any existing numbering systems in force today.

B. Provide nameplates for all equipment, motor starters, push button stations, pilot light stations or control points, and any other points in the building deemed necessary by the Owner’s representative.
   1. Nameplates shall be fabricated from black bakelite with white recessed letters permanently secured with screws.
   2. Nameplate schedule and sample shall be submitted for approval.

C. Provide permanent labels on all pieces of mechanical equipment designating the unit tag as it is shown on mechanical drawings.
D. As part of the Owner Instruction session, review the location of valves, circulators and other specialties concealed above ceilings. Furnish and install adhesive dots on ceiling tiles (in the corner) for access reference.

<table>
<thead>
<tr>
<th>Dot Color</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue</td>
<td>Domestic water</td>
</tr>
</tbody>
</table>

PART 2 PRODUCT

2.01 MATERIAL

A. Identification bands, tags, charts and dots shall be as manufactured by Seton or Carlton.

END OF SECTION
SECTION 22 06 10

SCHEDULES FOR PLUMBING PIPING AND PUMPS

PART 1 GENERAL

1.01 MATERIALS - GENERAL

A. Steel pipe shall be lap welded or seamless with maker's name rolled on each length equal to ASTM-A-53 of weight specified.

B. Copper tube shall be seamless, hard or soft equal to ASTM-B88 of type specified.

C. Cast iron soil pipe shall be standard weight coated cast iron soil pipe. Each length shall bear the maker's name, weight per foot and size cast thereon. Fittings and traps shall be similarly marked. Cast iron pipe and fittings shall meet or exceed the requirements of CISPI 301 and 310.

D. PVC pipe and fittings shall meet or exceed the requirements of ASTM D-1784 and 1785.

E. Pumps used in potable water systems shall be bronze construction of manufacturer scheduled, or equal.

PART 2 PRODUCT

2.01 SCHEDULE OF PLUMBING PIPE MATERIALS

<table>
<thead>
<tr>
<th>Service</th>
<th>Location</th>
<th>Size</th>
<th>Material</th>
<th>Type</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic C.W. &amp; H.W.</td>
<td>Building</td>
<td>All</td>
<td>Copper</td>
<td>Hard</td>
<td>Type L</td>
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<tr>
<td>Sanitary Waste &amp; Vent</td>
<td>Building</td>
<td>All</td>
<td>PVC</td>
<td>DWV</td>
<td>Sch. 40</td>
</tr>
<tr>
<td>AC Equipment Condensate</td>
<td>All</td>
<td>All</td>
<td>PVC</td>
<td>DWV</td>
<td>Sch. 40</td>
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</table>
2.02 SCHEDULE OF PLUMBING PIPE FITTINGS

<table>
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<th>Size</th>
<th>Material</th>
<th>Type</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>Domestic C.W. &amp; H.W.</td>
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<td>W. Copper</td>
<td>Soldered</td>
<td>Lead-free</td>
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<tr>
<td>Sanitary Waste &amp; Vent</td>
<td>Building</td>
<td>All</td>
<td>PVC</td>
<td>DWV</td>
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<tr>
<td>AC Equipment</td>
<td>All</td>
<td>All</td>
<td>PVC</td>
<td>DWV</td>
<td>ASTM 2665</td>
</tr>
</tbody>
</table>

Piping Notes:
1. No solder containing lead shall be present on site.
2. Rigid “ProPress” Fittings or Victaulic copper couplings may be used in lieu of soldered connections in copper piping systems at this contractor’s option.

2.03 TRAPS

A. Traps shall be of material and type conforming to the piping system in which installed. Traps shall be of plain pattern, having a seal of not less than 2½”, not greater than 4” except as noted on the drawings. All concealed 2” and larger traps shall be of the material specified for the piping system to which they are connected. All exposed fixture traps are to be as specified under the fixture schedule and or to match equipment tailpieces supplied by others.

2.04 CLEANOUTS

A. Cleanouts for cast iron pipe shall consist of tapped extra heavy cast iron ferrule, caulked into the cast iron fittings, and extra heavy brass tapered screw plug with solid hexagonal nut. The cleanout plugs shall comply with the plumbing code and shall have American Standard pipe threads. Cleanouts turning out through wall and floors shall be made by long sweep ells or “Wye” fittings and 1/8 inch bends; into these caulk the following:
   1. At the heel of each vertical sanitary drain install a “Dandy” cleanout.

B. Cleanouts in cast iron piping systems shall be Zurn models listed below, or of similar standard.
   1. Finished Floors - ZN1400-BP
   2. Carpeted Floors - ZN1400-BP-CM
   3. Unfinished Floors - Z1400-BP
   4. Finished Walls - Z-1441 or Z-1446

C. Cleanouts in PVC piping networks shall be compatible.
PART 3 EXECUTION

3.01 SOLDERING PIPE

A. Fittings in copper tubing shall be wrought copper for sweat solder joints. Joints in copper water piping shall be made with solder, per schedule, and shall meet ASTM-B32-96AM. Flux shall be equal to Canfield’s SOLDER-MATE and COPPER-MATE. No borax or alcohol mixtures or resin or similar paste fluxes shall be used. Care should be taken to see that no surplus flux is on the inside of the pipe when the joint is completed.

3.02 FIRE SEALANT

A. Fire sealing at all penetrations through rated general construction shall be in accordance with SECTIONS 07 80 00 AND 07 90 00.

B. Pipes passing through all masonry and fire rated gypsum board walls shall pass through clean cut holes fitted with steel pipe sleeves, the inside diameter of which shall be at least 1” greater than the outside of the pipe passing through it. Pipes passing through non-rated gypsum board walls do not require sleeves, but the void between wall opening and pipe must be sealed and taped. Pipe insulation shall be continuous through sleeve/hole and all space between pipe and sleeve/hole shall be caulked full with product per SECTIONS 07 80 00 AND 07 90 00. Installation details shall be in accordance with the sealant manufacturer’s published instructions in order to bear the UL Classification Marking.

C. Exposed pipes passing through walls, floors, partitions or ceilings shall be fitted with chromium plated heavy gauge wrought brass escutcheons, fit snugly and securely held in place.

D. Pipes passing through fire rated floors shall be sealed in keeping with paragraphs A, B and C.

E. Sanitary vent pipes passing through roofs shall be provided with a manufactured "boot" for installation by the G.C.

F. PVC and pipe penetrations through fire rated general construction shall be firestopped with UL listed sleeve assemblies as manufactured by 3M Fire Protection Products, Nelson Firestop Products or Grace Construction Products.

G. Submit firestopping product and details for review and approval. Coordinate product with the G.C. to assure project consistency. Provide a shop drawing by the fire sealant manufacturer that clearly identifies all products and the applicable UL classification or listing.

END OF SECTION
SECTION 22 07 00

PLUMBING INSULATION

PART 1 GENERAL

1.01 REQUIREMENTS

A. Provide all insulating materials required for piping, mechanical equipment and sheet metal work. The execution of the work shall be by an experienced Insulation Contractor in strict accordance with the best practice of the trade and the intent of the specifications.

B. Insulation thermal properties and thickness shall comply with the INTERNATIONAL ENERGY CONSERVATION CODE 2009 - CHAPTER 5.

PART 2 PRODUCT

2.01 MATERIAL

A. Insulation shall be as manufactured by Owens-Corning Fiberglass Corp., Knauf, Johns-Manville Co., or approved equal.

B. Insulating materials, jackets, adhesives, accessories and applications shall develop a system having a UL rating with a flame spread of not over 25, a fuel contributed rating of not over 50 and a smoke developed rating of not over 50.

C. Domestic Hot and Cold Water piping: Cover with molded, heavy density fiberglass pipe insulation with ASI/SSL. Adhere and seal end joint strips and overlap seams with proper mastic to provide continuous vapor barrier jacket. All fittings shall be insulated with precut fiberglass formed fittings with premolded PVC jacket mechanically fastened.

<table>
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<tr>
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<th>Pipe Size</th>
<th>Insulation Thickness</th>
</tr>
</thead>
<tbody>
<tr>
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<td>½” to 2”</td>
<td>1”</td>
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<td>23 05 00</td>
<td>Common Work Results for HVAC</td>
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<td>Expansion Fittings and Loops for HVAC Piping</td>
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<td>Air Outlets and Inlets</td>
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</tr>
</tbody>
</table>
SECTION 23 00 00

HEATING, VENTILATING AND AIR-CONDITIONING (HVAC)

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Description of HVAC system(s), quality expectations, materials and general requirements.

1.02 SYSTEM(S) DESCRIPTION

A. HVAC systems of this contract shall include:
   1. Heating, ventilating and air conditioning.
   2. Hot water terminals as specified and/or indicated.
   3. Thermal insulation for all systems.
   4. Testing and adjusting of all systems.
   5. General Conditions of the contract.
   6. Control systems and specialties.

1.03 RELATED DIVISIONS and SECTIONS

A. DIVISION 00 - Procurement and Contracting Requirements
B. DIVISION 01 - General Requirements
C. DIVISION 02 - Existing Conditions
D. DIVISION 07 - Thermal and Moisture Protection
E. DIVISION 21 - Fire Suppression
F. DIVISION 22 - Plumbing
G. DIVISION 25 - Integrated Automation
H. DIVISION 26 - Electrical

1.04 REFERENCES

A. 2009 International Building Code
C. New Hampshire State Fire Code
D. 2009 NFPA 1, National Fire Code, as adopted and amended by NH State Fire Code
E. 2009 International Plumbing Code with NH amendments
F. 2009 International Mechanical Code
G. 2009 International Energy Conservation Code
H. 2008 NFPA 70, National Electric Code
I. City of Manchester, New Hampshire ordinances, rules and regulations
J. Manchester Fire Department rules and regulations
K. All applicable ASTM Standards

1.05 SUBMITTALS

A. See SECTION 01 30 00 - Administrative Requirements, for submittal procedures.

END OF SECTION
SECTION 23 01 00

OPERATION AND MAINTENANCE OF HVAC SYSTEMS

PART 1 GENERAL

1.01 OPERATING AND MAINTENANCE MANUAL

A. In accordance with DIVISION 01 - GENERAL REQUIREMENTS, manufacturer’s printed operating and maintenance instructions for each piece of equipment furnished under DIVISION 23.

B. Each manual shall be suitably and neatly marked to identify the particular equipment furnished and shall include lubricating charts.

C. All instructions and charts shall be bound in appropriate cover binders properly indexed, identified, and titled to provide three (3) complete manuals.

D. Completed manuals shall be submitted to the Contract Administrator for review. After approval, the manuals shall become property of the Owner.

1.02 OWNER INSTRUCTION

A. This contractor and suppliers, if necessary, shall thoroughly instruct the Owner’s representative and maintenance personnel in the proper maintenance and operation of materials and systems installed under this Division, as follows:

1. Detailed written instructions shall be provided for all mechanical systems, including but not limited to:
   a. Winter shut-down, spring start-up of systems, if applicable.
   b. Heating fuel conversion, if applicable.
   c. All other operations that, if improperly performed, might endanger the building’s occupants or damage the building’s equipment or contents.

2. Sessions shall be held at the completed facility to instruct the Owner in the proper operation, cleaning, lubricating and maintenance of all mechanical systems, as well as water systems chemical treatment.

END OF SECTION
SECTION 23 05 00

COMMON WORK RESULTS FOR HVAC

PART 1 GENERAL

1.01 INTENT

A. Furnish all labor and materials to complete the installation of the HVAC systems as shown on the drawings, specified herein, or both as follows:
   1. Heating, ventilating and air conditioning.
   2. Hot water terminals as specified and/or indicated.
   3. Thermal insulation for all systems.
   4. Testing and adjusting of all systems.
   5. General Conditions of the contract.
   6. Control systems and specialties.

END OF SECTION
SECTION 23 05 16

EXPANSION FITTINGS AND LOOPS FOR HVAC PIPING

PART 1 GENERAL

1.01 SCOPE

A. Expansion compensators shall be as manufactured by NAI, Keflex, Victaulic, Southeastern Hose, Inc. or Mason Industries and sized for expansion indicated or required.

B. Anchors shall be designed to suit job conditions and located where indicated on drawings or directed.

C. Expansion joints, loops and anchors shall be provided as required to control expansion and allow pipes to move from anchor points to expansion points.

D. Refer to SECTIONS 23 05 29 for further information and requirements relative to this Section.

END OF SECTION
SECTION 23 05 23

GENERAL-DUTY VALVES FOR HVAC PIPING

PART 1 GENERAL

1.01 SCOPE

A. Provide shut-off valves to isolate sections of piping, every fixture and equipment. Valves shall be located at the inlet and outlet to permit removal for repairs without interfering with the remainder of the system.

B. Do not locate valves with stems below horizontal. Provide ball, check, balancing cocks, plus air vents and other type of valves as required for complete and proper valving of the entire installation, to control flow, shut-off, prevent backflow, provide drainage and control pressure and temperatures.

C. Valves shall be as manufactured by Watts, Apollo, Nibco, Victaulic, Anvil International, Grinnell or Milwaukee Valve Co.

PART 2 PRODUCT

2.01 MATERIAL

A. HWS&R 2” and smaller - Ball valves for flow control and/or tight shut-off shall be all bronze construction, full port brass ball with hard chrome plating, 150 swp, with blow-out-proof stem design, equal to Watts B-6080.

B. Check valves 2½” and less shall be bronze horizontal swing check, 125 swp, equal to NIBCO T-413-B.

D. Drain valves to be installed at low points in piping and as otherwise required to completely drain piping system and equipment. Drain valves shall be ball valves of size as shown or required, in no case smaller than ½” I.P.S., equal to Watts Series B-6000-CC with ¾” male thread for hose, end outlet with cap and chain.

E. Where manual balancing valves are indicated, furnish and install Tour & Andersson Model STAD or STAF or Macon Balancing Model STV globe style manual balancing valves, tight shut-off, packed under pressure, sized and installed as recommended by the manufacturer.

F. Approved strainers shall be installed in the inlet connections to equipment and automatic control valves to protect all apparatus or any automatic character whose proper function would be interfered with by dirt on the seat or by scoring of the seat. Strainers shall be equal to Watts series 777 and 77F-D.

END OF SECTION
PART 1 GENERAL

1.01 SCOPE

A. Provide suitable and substantial hangers and supports for all horizontal and vertical lines as manufactured by B-Line, Allegheny Industrial, Tolco or ITT Grinnell.

B. Support copper, steel, cast iron, and PVC piping in accordance with the pipe manufacturer’s published instructions, or the schedule below, whichever is more stringent.

C. Support piping in accordance with the following schedule:

<table>
<thead>
<tr>
<th>Pipe Material</th>
<th>Max. Horizontal Spacing</th>
<th>Max. Vertical Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copper tubing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1¼” &amp; smaller</td>
<td>6’</td>
<td>10’</td>
</tr>
<tr>
<td>Copper tubing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1½” &amp; larger</td>
<td>10’</td>
<td>10’</td>
</tr>
<tr>
<td>Steel pipe</td>
<td>12’</td>
<td>15’</td>
</tr>
<tr>
<td>PVC</td>
<td>As recommended by pipe manufacturer.</td>
<td></td>
</tr>
</tbody>
</table>

D. Piping, ductwork and equipment shall not be hung from the work of other trades.

E. Hang and support ductwork in accordance with SMACNA standards and best trade practices.

F. For equipment mounted outside of the building, calculate forces developed by 30 psf wind loads for the attachment of supports.

PART 2 PRODUCT

2.01 MATERIAL

A. Hangers shall be of heavy construction suitable for the size of pipe to be supported. All materials, except pipe rollers, shall be wrought or malleable iron or steel. Hangers shall be adjustable type.

B. Hangers and pipe clamps used on copper piping shall be solid copper or copper plated. Where tube is in contact with dissimilar metal, protect with shield or plastic cover.
C. The intention is to provide supports which in each case shall be amply strong and rigid for the load, but which shall not weaken or unduly stress the building construction.

D. Hangers for pipes up to and including 4” shall be swivel ring, split ring, wrought pipe clamp, band, or adjustable wrought clevis type.

E. Corrosion protection for vibration isolators for outdoor applications shall be as follows:
   1. Hardware shall be cadmium or zinc plated, all other metal parts shall be hot dipped galvanized or zinc electroplated.
   2. All hangers shall be capable of withstanding three times the rated load without failure.

F. Furnish and install shields and blocks to protect insulation and maintain thickness integrity at hanger rest points.

G. For piping ≥ 3” provide Teflon slide type supports MSS (Manufacturer’s Standardization Society) Type 35 or protective saddles MSS Type 39. For insulated piping, fill interior voids of saddles with segments of insulation to match adjoining pipe insulation.

H. For all insulated piping provide protective insulation shields MSS (Manufacturer’s Standardization Society) Type 40 as follows:

<table>
<thead>
<tr>
<th>Pipe Size</th>
<th>Length</th>
<th>Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>¼” to 3½”</td>
<td>12”</td>
<td>18 ga.</td>
</tr>
</tbody>
</table>

END OF SECTION
SECTION 2305 53

IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.01 SCOPE

A. Identification shall be provided on all piping that is exposed, as well as at all concealed locations such as crawl spaces, service tunnels, shafts and above removable ceilings in which piping may be viewed.

1. Furnish and affix approved adhesive bands identifying the service and direction of flow of the various piping systems.

2. A set of such bands shall be affixed to each pipe not less than 30' and there shall be at least one set of identifying bands in each room where piping may be viewed.

3. Each set shall consist of one band on which the name of the service is printed and one band on which is printed a black directional arrow.

B. Identification bands shall have adhesive backing. Submit same for approval.

1. The name of the service shall be printed in black letters not less than 2" high for 3" pipe and larger; 1" high for pipe 2½" and smaller.

2. Bands shall be applied where they can be read with their long dimension parallel to the axis of the pipe or duct.

3. Bands shall be applied only after finish painting is completed.

C. Attach to each valve a 2” brass tag on which shall be stamped designating letters and numbers ½” high filled with black enamel. Letters designate service.

1. The tags shall be securely fastened to the handle or spindle of the valve by a brass chain.

2. Furnish four (4) schedules of valves so tagged, mounted in the Operation & Maintenance (O&M) manuals.

3. One (1) copy of such schedules shall be mounted in glazed frames located in the new Boiler Room or where directed by the Owner’s representative. Review numbering with the Owner’s representative prior to installation and honor any existing numbering systems in force today.

4. The system of numbering for each service shall start with the No. 1 beginning at the point of main service and progress throughout the contract area.

D. Provide nameplates for all equipment, motor starters, push button stations, pilot light stations or control points, and any other points in the building deemed necessary by the Owner’s representative.

1. Nameplates shall be fabricated from black bakelite with white recessed letters permanently secured with screws.

2. Nameplate schedule and sample shall be submitted for approval.

3. Coordinate identification of exhaust fan switches provided by the Electrical Contractor.

E. Provide permanent labels on all pieces of mechanical equipment designating the unit tag as it is shown on mechanical drawings.
F. As part of the Owner Instruction session, review the location of valves, circulators, dampers and other specialties concealed above ceilings. Furnish and install adhesive dots on ceiling tiles (in the corner) for access reference.

<table>
<thead>
<tr>
<th>Dot Color</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>Heating and cooling</td>
</tr>
<tr>
<td>Blue</td>
<td>Domestic water</td>
</tr>
<tr>
<td>Green</td>
<td>Air-side specialty</td>
</tr>
</tbody>
</table>

PART 2 PRODUCT

2.01 MATERIAL

A. Identification bands, tags, charts and dots shall be as manufactured by Seton or Carlton.

END OF SECTION
SECTION 23 05 93

TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.01 TESTING AND BALANCING

A. Procure the service of an independent Testing and Balancing Agency that specializes in the testing and balancing of heating, ventilating and air conditioning systems.

B. Both the air and water systems shall be done by the same agency.

C. Work shall not begin until the agency has been notified in writing that all systems have been completed, cleaned and placed in full working sequence by this contractor. Clean filters shall be installed by this contractor prior to start of balancing work.

D. Test, balance and adjust all air moving equipment, terminals, supply, return and exhaust systems. Work together with the ATC Contractor to adjust setpoints of outside/return/exhaust dampers where applicable.

E. Test, balance and adjust all water systems to provide scheduled flows to all terminals and eliminate noise.

F. Perform all tests in accordance with standard procedures such as those outlined by the Associated Air Balance Council (AABC) and/or Sheet Metal and Air Conditioning Contractors National Association, Inc., (SMACNA).

G. At completion of all testing and balancing, leave all equipment systems, components, etc., adjusted within the limits of installed equipment and to within 10% of design requirements. Mark all setpoints of all dampers and valves with distinguishing marks. If requested, conduct tests in the presence of the Owner’s representative.

H. Within 15 days after completion of testing and balancing, submit for review six (6) copies of the testing and balancing results on industry recognized forms. Include a warranty period of 90 days during which time the Owner’s representative may request recheck or re-adjustment of any part of the job.

I. All reports shall clearly indicate the following minimum information:
   1. Air - System name, rated and actual HP, BHP, motor nameplate efficiency, voltage, amperage, fan rpm, suction, discharge and total static pressures, total system flow rate, individual terminal flow rates. Terminal readings must show location, make, model and size of register, grille, or diffuser. Include a static pressure profile of all AHU’s components.
   2. Water - Pump full flow and no-flow suction and discharge pressures, rated and actual amperage, HP, BHP, motor nameplate efficiency, voltage and total dynamic head. Calibrated balancing device readings shall indicate location, size, setting, differential pressure, and rated and actual GPM. 50% of the total automatic balancing valves installed shall be tested to verify proper function, and
reported on. All air handling unit coils and any other critical equipment shall be included in the 50% tested. Review details with the project engineer prior to conducting the work.

END OF SECTION
SECTION 23 06 20

SCHEDULES FOR HVAC PIPING

PART 1 GENERAL

1.01 MATERIALS - GENERAL

A. Steel pipe shall be lap welded or seamless with maker's name rolled on each length equal to ASTM-A-53 of weight specified.

B. Copper tube shall be seamless, hard or soft equal to ASTM-B88 of type specified.

C. PVC pipe and fittings shall meet or exceed the requirements of ASTM D-1784 and 1785.

PART 2 PRODUCT

2.01 SCHEDULE OF HVAC RELATED PIPE MATERIALS

<table>
<thead>
<tr>
<th>Service</th>
<th>Location</th>
<th>Size</th>
<th>Material</th>
<th>Type</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>HWS&amp;R</td>
<td>Above</td>
<td>2&quot; &amp;</td>
<td>Steel or</td>
<td>Screwed</td>
<td>Sch. 40</td>
</tr>
<tr>
<td>Grade</td>
<td></td>
<td>Smaller</td>
<td>Hard Copper</td>
<td>Tube</td>
<td>Type L</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HWS&amp;R</td>
<td>Above</td>
<td>2½&quot; &amp;</td>
<td>Steel</td>
<td>Roll</td>
<td>Sch. 10</td>
</tr>
<tr>
<td>Grade</td>
<td></td>
<td>Larger</td>
<td></td>
<td>Grooved</td>
<td></td>
</tr>
</tbody>
</table>

2.02 SCHEDULE OF HVAC RELATED PIPE FITTINGS & FLANGES

<table>
<thead>
<tr>
<th>Service</th>
<th>Location</th>
<th>Size</th>
<th>Material</th>
<th>Type</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>HWS&amp;R</td>
<td>Above</td>
<td>2&quot; &amp;</td>
<td>Steel or</td>
<td>Screwed</td>
<td>150#</td>
</tr>
<tr>
<td>Grade</td>
<td></td>
<td>Smaller</td>
<td>W. Copper</td>
<td>Soldered</td>
<td>Lead-free</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HWS&amp;R</td>
<td>Above</td>
<td>2½&quot; &amp;</td>
<td>Steel</td>
<td>Victaulic</td>
<td>150#</td>
</tr>
<tr>
<td>Grade</td>
<td></td>
<td>Larger</td>
<td></td>
<td>Zero-Flex</td>
<td></td>
</tr>
</tbody>
</table>

PART 3 EXECUTION

3.01 INTENT

A. Furnish and install all mechanical work of this contract in accordance with governing codes and in a workmanlike manner.

B. The run and arrangement of all HVAC related pipes shall be approximately as shown on the drawings and as directed during installation and shall be as straight and direct as possible, forming right angles or parallel lines with building walls and other pipes, and be neatly spaced.
C. Arrange work to avoid all interference with the work of all other trades. Consult with other contractors, and coordinate the location of their work with that of the others.

3.02 GENERAL INSTALLATION OF HVAC RELATED PIPING

A. All piping shall be properly supported or suspended on stands, clamps, hangers and the like, in accordance with sections 23 05 29.
   1. Supports shall be designed to permit free expansion and contraction while minimizing vibration.

B. Screw threads shall be cut clean and true. Bushings shall not be used.
   1. All reductions shall be made with eccentric reducers or eccentric fittings.
   2. All pipe two inch (2") or less shall be reamed after cutting to remove all burrs.

C. The drawings indicate generally the size and location of piping, and while sizes must not be decreased, the right is reserved for Owner’s representative to change runs and sizes of pipes in order to accommodate conditions on the job.
   1. Any pipes not indicated on the drawings shall be sized as directed and run where directed by the Owner’s representative.

D. Piping shall be properly graded to insure easy circulating and prevent noise and water hammer. Water piping shall pitch upward in the direction of flow, except the water piping located above finished ceilings which may be run level.
   1. Proper provision shall be made for expansion and contraction in all portions of pipe work to prevent undue strain on piping, fixtures or apparatus connected therewith.

E. Vent all high points and drain all low points in water systems as required to achieve perfect water circulation.

F. Take runouts off top of mains at 45° or 90° angle with at least one swing joint between riser or stub and main.

G. For change in horizontal piping size use eccentric reducer coupling with bottom of coupling horizontal.

3.03 HVAC RELATED PIPE JOINTS AND FITTINGS

A. Fittings for use on steel pipe shall be screwed iron or welded fittings of type and weight as scheduled. For hot water and chilled water services noted in the Schedule, mechanical fittings as manufactured by Victaulic, ANVIL International or Grinnell may be used. Note that only Zero-Flex couplings shall be used with Schedule 10 steel pipe. Gaskets used in the mechanical couplings must be compatible and rated for intended service with respect to pressure and water system inhibitors or glycol.

B. Flanges on steel pipe shall be screwed cast iron or welded type of weight to match the piping on which installed. For hot water and chilled water services noted in the Schedule, mechanical fittings as manufactured by Victaulic, ANVIL International or Grinnell may be used.
1. Flange gaskets shall be ring type 1/16" thick of compressed fiber and sealant suitable for service intended, factory cut for actual flange size and service pressure.

C. Dissimilar pipe materials (copper to steel, etc.) shall be joined with an approved dielectric fitting or brass coupling.

D. Flexible metal hose connectors shall be as manufactured by NAI, Southeastern Hose, Inc., Keflex, Proco Products, Inc., Victaulic or equal.

E. Furnish and install adapter fittings to mate the R-flex metric tube size to imperial fittings.

### 3.04 WELDING AND SOLDERING PIPE

A. Welded joints, outlets and flanges shall be used as shown on drawings, specified or directed. Welded joints may also be provided elsewhere at this Contractor's option except on piping smaller than 2½", or at points where it may be explicitly specified or directed to leave flanged joints in order to facilitate future changes.

B. All welded joints (except pipe welded end to end) shall be made by use of forged one-piece welding flanges caps, nozzles, elbows, branch outlets and tees, equal to WELDBEND.
   1. All such fittings shall be of a type which maintains full wall thickness at all points, ample radius and fillets, and proper bevels or shoulders at ends.
   2. Wel-o-lets or Thread-o-lets may be used where standard fittings or required sizes are not available and elsewhere approved.

C. All job welding shall be done by the electric arc welding process.
   1. All welding shall be done in accordance with the welding procedures of the National Certified Pipe Welding Bureau or other approved procedure, conforming to the requirements of the ASME Boiler and Pressure Vessel Code or the ASA Code for Pressure Piping.

D. All piping 2½" size and larger shall be butt welded with welded fittings. Stub welding shall not be permitted.

E. Fittings in copper tubing shall be wrought copper for sweat solder joints. Joints in copper water piping shall be made with solder, per schedule, and shall meet ASTM-B3296AM. Flux shall be equal to Canfield’s SOLDIER-MATE and COPPER-MATE. No borax or alcohol mixtures or resin or similar paste fluxes shall be used. Care should be taken to see that no surplus flux is on the inside of the pipe when the joint is completed.

### 3.05 FIRE SEALANT

A. Fire sealing at all penetrations through rated general construction shall be in accordance with SECTIONS 07 80 00 and 07 90 00.

B. Pipes passing through all masonry and fire rated gypsum board walls shall pass through clean cut holes fitted with steel pipe sleeves, the inside diameter of which shall be at
least 1” greater than the outside of the pipe passing through it. Pipes passing through non-rated gypsum board walls do not require sleeves, but the void between wall opening and pipe must be sealed and taped. Where UL approved for the application, pipe insulation shall be continuous through sleeve/hole, and all space between pipe and sleeve/hole shall be caulked full with product per SECTIONS 07 80 00 and 07 90 00. Installation details shall be in accordance with the sealant manufacturer’s published instructions in order to bear the UL Classification Marking.

C. Exposed pipes passing through walls, floors, partitions or ceilings shall be fitted with chromium plated heavy gauge wrought brass escutcheons, fit snugly and securely held in place.

D. Ducts passing through rated walls shall be caulked with a minimum of 1¼” thickness of fill material applied within annulus, flush with both surfaces of wall assembly. At the point contact location between duct and wallboard, a minimum ¼” diameter bead of caulk shall be applied at the wallboard/duct interface on both surfaces of wall assembly. Void fill material must bear the UL Classification Marking and installation details shall be in accordance with the sealant manufacturer’s published instructions in order to bear the UL Classification Marking.

E. Pipes and ducts passing through fire rated floors shall be sealed in keeping with paragraphs A, B and D.

F. PVC and CPVC pipe penetrations through fire rated general construction shall be firestopped with UL listed sleeve assemblies as manufactured by 3M Fire Protection Products, Nelson Firestop Products or Grace Construction Products.

G. Submit firestopping product and details for review and approval. Coordinate product with the G.C. to assure project consistency. Provide a shop drawing by the fire sealant manufacturer that clearly identifies all products and the applicable UL classification or listing for penetrations applicable to the project.

END OF SECTION
SECTION 23 07 00

PIPE INSULATION

PART 1 GENERAL

1.01 SCOPE

A. Provide all insulating materials required for piping and mechanical equipment. The execution of the work shall be by an experienced Insulation Contractor in strict accordance with the best practice of the trade and the intent of the specifications.

B. Insulation thermal properties and thickness shall comply with the INTERNATIONAL ENERGY CONSERVATION CODE 2009 - CHAPTER 5.

PART 2 - PRODUCT

2.01 MATERIAL

A. Insulation shall be as manufactured by Owens-Corning Fiberglass Corp., Knauf, Johns-Manville Co., or approved equal.

B. Insulating materials, jackets, adhesives, accessories and applications shall develop a system having a UL rating with a flame spread of not over 25, a fuel contributed rating of not over 50 and a smoke developed rating of not over 50.

C. Hot Water Supply & Return piping: Cover with molded, heavy density fiberglass pipe insulation with ASJ/SSL. Adhere and seal end joint strips and overlap seams with proper mastic to provide continuous vapor barrier jacket. All fittings shall be insulated with precut fiberglass formed fittings with premolded PVC jacket mechanically fastened, including unions, couplings, flanges and air separators where applicable.

<table>
<thead>
<tr>
<th>Service</th>
<th>Pipe Size</th>
<th>Insulation Thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>HWS&amp;R</td>
<td>up to 1½”</td>
<td>1½”</td>
</tr>
<tr>
<td>HWS&amp;R</td>
<td>2” &amp; larger</td>
<td>2”</td>
</tr>
</tbody>
</table>

D. Insulate exposed pipe drops to fin-tube radiation and other heating terminals subject to physical abuse per C. of this Section, but cover entire exposed length with protective 30 mil PVC jacket (white).

END OF SECTION
SECTION 23 07 13

DUCT INSULATION

PART 1 GENERAL

1.01 SCOPE

A. Provide all insulating materials required for piping and mechanical equipment. The execution of the work shall be by an experienced Insulation Contractor in strict accordance with the best practice of the trade and the intent of the specifications.

B. Insulation thermal properties and thickness shall comply with the INTERNATIONAL ENERGY CONSERVATION CODE 2009 - CHAPTER 5.

PART 2 PRODUCT

2.01 MATERIAL

A. Insulation shall be as manufactured by Owens-Corning Fiberglass Corp., Knauf, Johns-Manville Co., or approved equal.

B. Insulating materials, jackets, adhesives, accessories and applications shall develop a system having a UL rating with a flame spread of not over 25, a fuel contributed rating of not over 50 and a smoke developed rating of not over 50.

C. Insulate all fresh air intake ductwork, relief and exhaust fan plenums, supply ductwork concealed above ceiling or in a chase and ceiling or inline exhaust fans discharge ductwork externally with 1½” foil faced .75 PCF (R = 5.2) fiberglass insulation. Insulation shall be wrapped tightly on ductwork with all circumferential joints butted together and longitudinal joints overlapped 2”. Staple longitudinal joints securely and foil tape all joints air tight. Interior ductwork shown to be acoustically lined does not have to be wrapped.

D. Acoustic lining shall be 1” thick flexible closed cell duct liner. Lining shall meet the Life Safety Standards of NFPA 90A, NFPA No. 101 Class A Rating, UL 94-5V Flammability Classification and shall meet the requirements of ASTM E96, ASTM D1056, ASTM D1171 and UL 181 for resistance to microdial growth and air erosion. Dimensions of lined duct on the drawings are the inside dimensions of the duct after the lining has been installed. Product shall be Nomaco K-FLEX, Armstrong AP Armaflex or IMCOA IMCOSHEET.

PART 3 EXECUTION

3.01 INSTALLATION

A. All external insulation systems on ductwork, breechings and the like shall be applied in strict accordance with the insulation manufacturer’s published instructions.

END OF SECTION
PART 1 GENERAL

1.01 AUTOMATIC TEMPERATURE CONTROL

A. Refer to DIVISION 25 for Automatic Temperature Control work.

END OF SECTION
SECTION 23 20 00
HVAC PIPING AND SPECIALTIES

PART 1 GENERAL

1.01 DESCRIPTION

A. HVAC piping shall be as scheduled in SECTION 23 06 20.

1.02 SCOPE

A. Furnish all hot water equipment and specialties of configuration, model and manufacturer indicated on the drawings or as specified hereinafter.

PART 2 PRODUCT

2.01 SPECIALTIES

A. Manual Air Venting Devices:
   1. For hot and chilled water terminals (unless otherwise shown on drawings), provide manual air vents. Air vents shall be quarter turn open ¼” ball cocks with extended drain line, located to permit easy use.

B. Pressure relief valves shall be ASME rated for pressure and duty intended.

C. Furnish and install automatic air vents of capacity and location as shown on plans.

END SECTION
PART 1 GENERAL

1.01 SCOPE

A. Furnish and install a complete and working refrigerant piping system between points of connection as shown on plans and specified herein. The entire installation shall be done in a workmanlike manner and shall conform with best trade practices and EPA regulations.

PART 2 PRODUCT

2.01 MATERIAL

A. Piping: Provide nitrogenized “ACR” hard drawn copper with solder fitting suitable for refrigerant used, of size and configuration recommended by the equipment manufacturer. Use wrought copper solder type fittings. Brazed joint compound shall be “Sil-Fos”, or approved equal.

B. Hangers: Provide copper hangers 3’-0” O.C.

PART 3 EXECUTION

3.01 PROCEDURE

A. Test for leaks by means of nitrogen bleed process at all joints. Repair leaks and purge system and re-test. Do not use the compressor to build up pressure. System shall prove to be leak tight for a 24-hour period.

B. Dehydrate systems per manufacturer’s recommendations and best trade practices.

C. Charge with refrigerant in accordance with manufacturer’s recommendations.

D. Insulate refrigeration suction lines with 1½” thick pipe insulation.

END SECTION
SECTION 23 31 00

HVAC DUCTS AND ACCESSORIES

PART 1 GENERAL

1.01 SCOPE

A. Furnish and install all ductwork, grille boxes, plenum chambers, dampers, and all auxiliary work of any kind necessary to make the various air handling systems of the building complete and ready for satisfactory operating. All ductwork shall be constructed in accordance with SMACNA Standards for the applicable pressure classification.

B. Throughout construction, all open end supply/return air ductwork and terminals shall be sealed with tape and plastic until the building is free of dust. No air handling equipment shall be operated until the building is clean. Refer to DIVISION 01 and 02.

PART 2 PRODUCT

2.01 MATERIAL

A. Low Pressure and Medium Pressure Ductwork:
2. Volume dampers shall be furnished and installed as shown or required for balancing the systems. Dampers operators shall be of the quadrant type provided with approved operating and locking device mounted outside the duct in accessible location. Install handles to indicate position of damper blades.
3. Ductwork layouts as shown on the drawings shall be adhered to as closely as possible, however, the right is reserved to vary the runs and sizes of ductwork and to make offsets where necessary to accommodate conditions arising in the field.
4. Flexible connections shall be installed at the inlet and outlet of each fan and in main runs of ductwork where indicated. Flexible connections shall be 30 oz. glass cloth with neoprene coating on each face.
5. Seal all joints with a water based sealant, equal to DUCTMATE PROseal or approved equal, applied per manufacturer's recommendations. Joints in low pressure ductwork shall be sealed to meet SMACNA Seal Class C - 2” w.g., and medium pressure Seal Class A - 4” w.g., as applicable.
6. Dimensions of acoustically lined ductwork shown on plans are inside dimensions of the duct after the lining has been installed.
7. Sheet metal angle closures shall be provided around all ductwork penetrating walls exposed to view.
8. Flat seam construction shall be employed where standing seam may present a hazard to personnel.
9. All exposed ductwork shall have a paintable finish.
B. Spiral Duct:
1. Spiral duct shall be SMACNA recommended gauge, medium and low pressure uniseal duct and fittings as manufactured by United Sheet Metal or approved equal.
2. Duct shall be machine formed, made from standard gauge premium grade, coiled, galvanized sheet metal in a series of continuous automatic operations.
3. Duct shall be manufactured from galvanized steel meeting ASTM A-527-71 in manufacturer’s gauges.
4. Fittings shall be die-stamped SMACNA recommended gauge galvanized steel, continuously welded seams.
5. Joints shall be slip coupling type sealed with DUCTMATE PROseal or equal. Low pressure ductwork shall be sealed to meet SMACNA Seal Class C - 2” w.g., and medium pressure Seal Class A - 4” w.g., as applicable.
6. All exposed ductwork shall have a paintable finish.

C. Flex Duct:
1. Flexible duct shall be Buckley “Flexmaster Type 4” insulated for heating and cooling applications (supply).

D. Access Doors:
1. Access doors shall be provided in ductwork of the size required to completely access and functionally service equipment contained within the ductwork.
2. Access doors shall meet ASHRAE Standards criteria, and be equal to Ruskin model ADH22 for rectangular ductwork, or United McGill bolted access doors for spiral ductwork.
3. Access doors shall be installed in ductwork on upstream and downstream sides of all heating coils and as required to reset fire dampers.

E. Fire Dampers:
1. Fire dampers shall be installed where shown and/or required by all applicable codes and regulations. Dampers shall be Type B, low leakage, out airstream type and meet UL 555 rating requirements for dynamic systems. All dynamic fire dampers installed in low pressure ductwork shall be rated for 2000 feet per minute and 4” w.g. static pressure as required by UL 555.

END OF SECTION
SECTION 23 37 00

AIR OUTLETS AND INLETS

PART 1 GENERAL

1.01 GRILLES, REGISTERS AND DIFFUSERS

A. Furnish and install grilles, registers and diffusers of size, type and quality indicated.

B. Provide neoprene or similar gasket on face flange of all grilles, registers and diffusers.

C. Grilles, registers and diffusers shall be as manufactured by Price, Metal Aire, Titus or Krueger.

D. Exact location of all grilles, registers, diffusers and louvers shall be coordinated with architectural details, reflected ceiling plans and shop drawings.

END OF SECTION
SECTION 23 47 00

SPLIT-SYSTEM AIR-CONDITIONING UNIT

PART 1 GENERAL

1.01 SCOPE

A. Provide split-system air-conditioning units of type indicated on the drawings or approved equal by LG or Daikin.

B. Capacities and types of split-system air-conditioning units shall be in accordance with the equipment schedules as shown.

C. Vibration isolation mounts shall be provided for all split-system air-conditioning units as required.

D. Furnish split-system air-conditioning units with all features and accessories scheduled on plans.

1.02 WARRANTY

A. A manufacturer’s extended parts and labor warranty for five years from substantial completion shall be provided at no additional cost.

END OF SECTION
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DIVISION 25 - INTEGRATED AUTOMATION

SECTION 25 00 00  Integrated Automation
PART 1 GENERAL

1.01 SECTION INCLUDES

A. Description of Integrated Automation system(s), quality expectations, materials and general requirements.

1.02 SYSTEM(S) DESCRIPTION

A. The existing building is served by an CTI Integrated DDC System. This system shall be extended and expanded as required to achieve the controls requirements of the contract area.

1.03 SEQUENCES OF OPERATION

A. Hydronic Cabinet Heater Control:

1. Cabinet heater shown to be controlled by an ACV and shall have a two-way, two-position 24V electric ACV to respond to local thermostat command. Upon a call for heat, ACV shall open and the unit fan shall energize. When the thermostat is satisfied, fan shall stop and ACV shall close.

B. Radiation Control:

1. Wall mounted radiation shown to be controlled independently by an ACV and shall be a two-way, two-position, 24V electric ACV to respond to local thermostat command.

END OF SECTION
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DIVISION 26 - ELECTRICAL

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SECTION 26 00 00

ELECTRICAL GENERAL PROVISIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Applicable provisions of Division 01 shall govern work under this section.

B. Refer to Division 07 – Through-Penetration Firestop Systems, for sealing requirements at penetrations of fire rated surfaces.

1.02 CODES AND PERMITS

A. Perform all work in strict accordance with the requirements of the 2011 NEC, 2009 IEEC and the 2009 IBC. Requirements outlined therein shall be minimum as related to this work.

B. Arrange for Code required inspections and pay for same if not covered by permit costs.

1.03 WORK PRIORITY AND COORDINATION

A. Contractor, his mechanics and subcontractors shall cooperate with all others so construction may proceed without hindrances and in all cases to the best interests of the Owner. Confer with others regarding any work that may affect this work and arrange piping, ductwork, equipment, etc. in proper relation to that of others. Coordinate prior to installation the arrangement of electrical work as related to plumbing, HVAC and general construction work.

1.04 DRAWINGS

A. The drawings are schematic in nature indicating the general location of all electrical equipment and devices. While the sizes and locations have been indicated, the Contractor shall properly adjust his work to meet conditions as they actually exist on the premises. Equipment and devices shall provide adequate and acceptable clearance for entry, servicing and maintenance. Minor adjustments shall be discussed with the Engineer with the view to convenience of operation and noninterference with other work. The Engineer reserves the right to change the location of any conduit, device or piece of equipment to suit conditions, with no added cost to the Owner if the requested change does not modify the scope of work. Should the particular equipment which any contractor proposes to install require other space conditions, other utility service, or other structural support than those indicated on the drawings, the Contractor shall arrange for such changes with other affected Contractors and with the Architect. Required changes shall be noted on the submittal cover sheet. Should changes become necessary the Contractor shall make such changes at his expense.
1.05 SUBMITTALS

A. Furnish shop drawings on items as indicated in individual sections including switchgear, devices, fixtures, firestopping, fire alarm equipment, and other equipment. The contractor acknowledges its responsibility to submit complete shop drawings and other required submittals. Incomplete submittals will be returned to the contractor unreviewed. No time extensions or cost increases will be allowed for delays caused by return of incomplete submittals. Shop drawings for equipment which are noted as being reviewed by Architect or his Engineer shall not supersede Contract Documents or relieve Contractor from responsibility for deviations from the Contract Documents.

B. Furnish 2 sets of standard operating instructions and complete repair parts lists for the Owner for items of equipment and controls. Also include a summary of maintenance procedures required monthly, yearly, etc. for all equipment. Submit in binders to Engineer for approval.

1.06 REMODELING WORK

A. Wherever remodeling work or demolition of existing equipment, light fixtures, conduit, etc. is a part of plans and specifications, Contractor shall visit the site and thoroughly examine all existing conditions. Provide all required work necessary for interconnection of existing services with new system and removal of existing unused components.

B. Contractors shall notify the Architect at least 10 days prior to the bid closing date of any deviations or required changes that are noticed. No allowance for additional costs for work related to existing conditions will be permitted after bidding unless proof of hidden work, breakage or damage could not be determined by inspection or examination by the Contractor.

1.07 HOUSEKEEPING

A. This Contractor shall periodically remove debris caused by his operations. On completion he shall remove all debris from his work and leave same neat and clean, ready for use by the Owner.

1.08 PROTECTION OF MATERIALS AND EQUIPMENT

A. Materials and equipment shall be protected at all times. This Contractor shall be responsible for all damage caused directly or indirectly by his workmen. Equipment shall be tightly covered and protected against dirt, water, and chemical or mechanical injury. At the completion of all work, the equipment shall be thoroughly cleaned and delivered to the Owner in a condition satisfactory to the Engineer.

B. Equipment shall not be used during construction unless approved in writing by the Engineer. Equipment used during construction shall be returned to the original condition, which may include such items as replacing lamps, cleaning lenses, and replacing damaged devices.
1.09 PAINTING

A. All equipment shall have manufacturer's standard baked enamel finish and shall not be job painted "unless otherwise specified". Equipment in finished rooms shall have color selected by Engineer from manufacturer's standard colors. All required touch up painting of pre-finished surfaces by this Contractor.

1.010 INSTRUCTIONS

A. The Contractor shall review with the Owner's representative complete operating and maintenance procedures for equipment and systems installed under this contract. Provide 1 day of instruction during normal working hours when systems are fully operational and before final payment.

PART 2 - PRODUCTS

2.01 QUALITY REQUIREMENTS

A. Items indicated on the drawings and in the specifications are listed by manufacturer in order to describe minimum quality requirements.

B. Materials and equipment shall conform to requirements of Wisconsin Administrative Code.

C. All materials and equipment furnished shall be new and shall be the standard products of manufacturers regularly engaged in the production of Electrical and Fire Alarm materials and equipment.

END SECTION
SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:
   1. Building wires and cables rated 600 V and less.
   2. Connectors, splices, and terminations rated 600 V and less.

B. Related Requirements:
   1. Section 271500 "Communications Horizontal Cabling" for cabling used for voice and data circuits.

PART 2 - PRODUCTS

2.01 CONDUCTORS AND CABLES

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:

B. Subject to compliance with requirements, provide or comparable product by one of the following:
   1. Alcan Products Corporation; Alcan Cable Division.
   2. Alpha Wire.
   3. Belden Inc.
   5. General Cable Technologies Corporation.

C. Copper Conductors: Comply with NEMA WC 70/ICEA S-95-658.

D. Conductor Insulation: Comply with NEMA WC 70/ICEA S-95-658 for Type THHN-2-THWN-2 Type XHHW-2 and Type SO.
E. Multiconductor Cable: Comply with NEMA WC 70/ICEA S-95-658 for metal-clad cable, Type MC and Type SO with ground wire. Type MC shall be steel clad. Type MC fittings shall be steel.

2.02 CONNECTORS AND SPLICES

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. AFC Cable Systems, Inc.
2. Gardner Bender.
4. Ideal Industries, Inc.
5. Ilsco; a branch of Bardes Corporation.
6. NSi Industries LLC.
7. O-Z/Gedney; a brand of the EGS Electrical Group.
8. 3M; Electrical Markets Division.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

2.03 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

PART 3 - EXECUTION

3.01 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits: Copper. Solid for No. 12 AWG; stranded for No. 10 AWG and larger.

3.02 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Exposed Feeders: Type THHN-2-THWN-2, single conductors in raceway Type XHHW-2, single conductors in raceway.

B. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN-2-THWN-2, single conductors in raceway Metal-clad cable, Type MC.
C. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type XHHW-2, single conductors in raceway.

D. Exposed Branch Circuits, Including in Crawlspaces: Type THHN-2-THWN-2, single conductors in raceway.

E. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-2-THWN-2, single conductors in raceway, Metal-clad cable, Type MC.

F. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type Type XHHW-2, single conductors in raceway.

G. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.

3.03 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.04 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.

B. Make splices, terminations, and taps that are compatible with conductor material.

C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches (150 mm) of slack.
3.05 IDENTIFICATION

A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."

B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.06 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 07 "Penetration Firestopping."

3.07 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test service feeder conductors for compliance with requirements.

2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification.

B. Cables will be considered defective if they do not pass tests and inspections.

END OF SECTION
SECTION 26 05 26

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section includes grounding and bonding systems and equipment.

1.03 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.01 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. Burndy; Part of Hubbell Electrical Systems.
2. Dossert; AFL Telecommunications LLC.
3. ERICO International Corporation.
4. Fushi Copperweld Inc.
5. Galvan Industries, Inc.; Electrical Products Division, LLC.
6. Harger Lightning and Grounding.
7. ILSCO.
9. Robbins Lightning, Inc.
10. Siemens Power Transmission & Distribution, Inc.
2.02 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 467 for grounding and bonding materials and equipment.

2.03 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors:
   4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
   5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
   6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

C. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

D. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches (6.3 by 100 mm) in cross section, with 9/32-inch (7.14-mm) holes spaced 1-1/8 inches (28 mm) apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V. 24” Long in telecom rooms.

2.04 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy.

C. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.
PART 3 - EXECUTION

3.01 APPLICATIONS

A. Conductors: Install solid conductor for #10 AWG and smaller, and stranded conductors for #8 AWG and larger unless otherwise indicated.

B. Conductor Terminations and Connections:
   1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.

3.02 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.

B. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.

3.03 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

C. Install grounding bus above 7’-0” AFF in telecom/server rooms. Provide #2 AWG Cu ground wire to service ground and #10 AWG Cu ground wire from bus to each server rack.

END OF SECTION
SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:
   1. Hangers and supports for electrical equipment and systems.
   2. Construction requirements for concrete bases.

B. Related Sections include the following:
   1. Section 260548 "Vibration and Seismic Controls for Electrical Systems" for products and installation requirements necessary for compliance with seismic criteria.

1.03 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. IMC: Intermediate metal conduit.

C. RMC: Rigid metal conduit.

1.04 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
1.05 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Comply with NFPA 70.

1.06 COORDINATION

A. Coordinate installation of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 "Roof Accessories."

PART 2 - PRODUCTS

2.01 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Allied Tube & Conduit.
   b. Cooper B-Line, Inc.; a division of Cooper Industries.
   c. ERICO International Corporation.
   d. GS Metals Corp.
   e. Thomas & Betts Corporation.
   f. Unistrut; Tyco International, Ltd.
   g. Wesanco, Inc.

2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.

3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.

4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.

5. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
   a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      1) Cooper B-Line, Inc.; a division of Cooper Industries.
      2) Empire Tool and Manufacturing Co., Inc.
      3) Hilti Inc.
      4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      5) MKT Fastening, LLC.

2. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
3. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
5. Toggle Bolts: All-steel springhead type.

2.02 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Division 05 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.01 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
1. Secure raceways and cables to these supports with single-bolt conduit clamps.

### 3.02 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
5. To Light Steel: Sheet metal screws.
6. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

### 3.03 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Division 05 "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.
3.04 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION
SECTION 260533

RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Metal conduits, tubing, and fittings.
2. Boxes, enclosures, and cabinets.

1.03 DEFINITIONS

A. ARC: Aluminum rigid conduit.
B. GRC: Galvanized rigid steel conduit.
C. IMC: Intermediate metal conduit.

PART 2 - PRODUCTS

2.01 METAL CONDUITS, TUBING, AND FITTINGS

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. AFC Cable Systems, Inc.
3. Anamet Electrical, Inc.
4. Electri-Flex Company.
5. O-Z/Gedney.
6. Picoma Industries.
7. Republic Conduit.
8. Robroy Industries.
10. Thomas & Betts Corporation.
11. Western Tube and Conduit Corporation.

B. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. GRC: Comply with ANSI C80.1 and UL 6.
D. ARC: Comply with ANSI C80.5 and UL 6A.
E. IMC: Comply with ANSI C80.6 and UL 1242.
F. EMT: Comply with ANSI C80.3 and UL 797.
G. FMC: Comply with UL 1; zinc-coated steel.
H. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
I. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
   1. Fittings for EMT:
      a. Material: Steel.
      b. Type: Setscrew or compression.
   2. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.

J. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.02 BOXES, ENCLOSURES, AND CABINETS

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. Adalet.
   2. Cooper Technologies Company; Cooper Crouse-Hinds.
   3. EGS/Appleton Electric.
   5. FSR Inc.
   8. Kraloy.
   10. Mono-Systems, Inc.
12. RACO; Hubbell.
13. Robroy Industries.
14. Spring City Electrical Manufacturing Company.
15. Stahlin Non-Metallic Enclosures.
17. Wiremold / Legrand.

B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.

C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.

E. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb (23 kg). Outlet boxes designed for attachment of luminaires weighing more than 50 lb (23 kg) shall be listed and marked for the maximum allowable weight.

F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

G. Box extensions used to accommodate new building finishes shall be of same material as recessed box.

H. Device Box Dimensions: 4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep) 4 inches by 2-1/8 inches by 2-1/8 inches deep (100 mm by 60 mm by 60 mm deep).

I. Gangable boxes are prohibited.

PART 3 - EXECUTION

3.01 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed Conduit: GRC IMC.
2. Concealed Conduit, Aboveground: GRC IMC.
3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

B. Indoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed, Not Subject to Severe Physical Damage: EMT.
3. Exposed and Subject to Severe Physical Damage: GRC IMC. Raceway locations include the following:
a. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.

4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
6. Damp or Wet Locations: GRC IMC.
7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 in institutional and commercial kitchens and damp or wet locations.

C. Minimum Raceway Size: 3/4-inch (21-mm) trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. EMT: Use setscrew or compression, steel fittings. Comply with NEMA FB 2.10.
3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.

F. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

3.02 INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

B. Keep raceways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.

E. Arrange stub-ups so curved portions of bends are not visible above finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches (300 mm) of changes in direction.

G. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
H. Support conduit within 12 inches (300 mm) of enclosures to which attached.

I. Stub-ups to Above Recessed Ceilings:
   1. Use EMT, IMC, or RMC for raceways.
   2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

J. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

K. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.

L. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch (35mm) trade size and insulated throat metal bushings on 1-1/2-inch (41-mm) trade size and larger conduits terminated with locknuts.

M. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.

N. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.

O. Cut conduit perpendicular to the length. For conduits 2-inch (53-mm) trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.

P. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

Q. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
   1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces or between exterior and interior locations.
   2. Where otherwise required by NFPA 70.

R. Comply with manufacturer's written instructions for solvent welding RNC and fittings.

S. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches (1830 mm) of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
   1. Use LFMC in damp or wet locations.
T. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.

U. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

V. Locate boxes so that cover or plate will not span different building finishes.

W. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.

X. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits u.n.o.

3.03 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Division 07 "Penetration Firestopping."

3.04 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.

   1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.

END OF SECTION
SECTION 26 05 48

VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Contractor shall provide an “Electrical Vibration-Control and Seismic-Restraint Schedule” identifying equipment to be controlled, how the equipment is to be controlled. See Part 3 for representative schedule.

B. Related Sections include the following:

1. Section 260529 "Hangers and Supports for Electrical Systems" for commonly used electrical supports and installation requirements.

C. Contractor shall design seismic controls and provide details and schedule to show how equipment will be restrained from a seismic event.

1.03 DEFINITIONS


C. OSHPD: Office of Statewide Health Planning and Development for the State of California.

1.04 PERFORMANCE REQUIREMENTS

A. Seismic-Restraint Loading:

1. Site Class as Defined in the IBC: D
2. Assigned Seismic Use Group or Building Category as Defined in the IBC: III.

   a. Component Importance Factor: 1.0
   b. Component Response Modification Factor: 1.5.
   c. Component Amplification Factor: 1.0.
1.05 ACTION SUBMITTALS

A. Product Data: For the following:

1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of seismic-restraint component used.
   a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an agency acceptable to authorities having jurisdiction.
   b. Annotate to indicate application of each product submitted and compliance with requirements.


B. Delegated-Design Submittal: For seismic-restraint details 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. Design Calculations: Calculate static and dynamic loading due to equipment weight and operation, seismic forces required to select vibration isolators and seismic restraints.
   a. Coordinate design calculations with wind-load calculations required for equipment mounted outdoors. Comply with requirements in other electrical Sections for equipment mounted outdoors.

2. Indicate materials and dimensions and identify hardware, including attachment and anchorage devices.

3. Field-fabricated supports.

4. Seismic-Restraint Details:
   a. Design Analysis: To support selection and arrangement of seismic restraints. Include calculations of combined tensile and shear loads.
   b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events.
   c. Preapproval and Evaluation Documentation: By an agency acceptable to authorities having jurisdiction, showing maximum ratings of restraint items and the basis for approval (tests or calculations).

5. Electrical Vibration-Control and Seismic-Restraint Schedule, including:
   a. Conduits
   b. Light Fixtures
1.06 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

B. Comply with seismic-restraint requirements in the IBC.

C. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are not available, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

E. Comply with NFPA 70.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

A. Install flexible connections in runs of raceways, cables, wireways, cable trays, and busways where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where they terminate with connection to equipment that is anchored to a different structural element from the one supporting them as they approach equipment.

3.02 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.

2. Schedule test with Owner, through Architect, before connecting anchorage device to restrained component (unless postconnection testing has been approved), and with at least seven days' advance notice.
4. Test at least four of each type and size of installed anchors and fasteners selected by Architect.
5. Test to 90 percent of rated proof load of device.
7. Measure isolator deflection.
8. Verify snubber minimum clearances.
9. If a device fails test, modify all installations of same type and retest until satisfactory results are achieved.

C. Remove and replace malfunctioning units and retest as specified above.

D. Prepare test and inspection reports.

3.03 ADJUSTING

A. Adjust isolators after isolated equipment is at operating weight.

B. Adjust limit stops on restrained spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

C. Adjust active height of spring isolators.

D. Adjust restraints to permit free movement of equipment within normal mode of operation.

3.04 EXAMPLE OF “ELECTRICAL VIBRATION-CONTROL AND SEISMIC-RESTRAINT DEVICE SCHEDULE”

A. Supported or Suspended Equipment: <Insert name and drawing designation>.

1. Equipment Location: <Insert room number>.
2. Pads:
   a. Material: [Neoprene] [Rubber] [Hermetically sealed compressed fiberglass].
   b. Thickness: <Insert inches (mm)>.
   c. Durometer: <Insert number>.
   d. Number of Pads: <Insert number> thick.

3. Isolator Type: <Insert generic name or designation used in Part 2>.
4. Component Importance Factor: [1.0] [1.5].
5. Component Response Modification Factor: [1.5] [2.5] [3.5] [5.0].
6. Component Amplification Factor: [1.0] [2.5].

END OF SECTION
SECTION 26 05 53
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Identification for raceways.
2. Identification of power and control cables.
3. Identification for conductors.
4. Warning labels and signs.
5. Instruction signs.
7. Miscellaneous identification products.

1.03 QUALITY ASSURANCE

A. Comply with ANSI A13.1.
B. Comply with NFPA 70.
D. Comply with ANSI Z535.4 for safety signs and labels.
E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.04 COORDINATION

A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

C. Coordinate installation of identifying devices with location of access panels and doors.

D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.01 CONDUCTOR IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide.

B. Self-Adhesive, Self-Laminating Polyester Labels: Preprinted, 3-mil- (0.08-mm-) thick flexible label with acrylic pressure-sensitive adhesive that provides a clear, weather- and chemical-resistant, self-laminating, protective shield over the legend. Labels sized to fit the conductor diameter such that the clear shield overlaps the entire printed legend.

2.02 WARNING LABELS AND SIGNS


B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

C. Metal-Backed, Butyrate Warning Signs:

   1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch (1-mm) galvanized-steel backing; and with colors, legend, and size required for application.
   2. 1/4-inch (6.4-mm) grommets in corners for mounting.
   3. Nominal size, 10 by 14 inches (250 by 360 mm).

D. Warning label and sign shall include, but are not limited to, the following legends:

   1. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."

2.03 EQUIPMENT IDENTIFICATION LABELS

A. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm).
B. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).

2.04 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Verify identity of each item before installing identification products.

B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

C. Apply identification devices to surfaces that require finish after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

F. Attach plastic raceway and cable labels that are not self-adhesive type with clear vinyl tape with adhesive appropriate to the location and substrate.

G. SystemPainted Identification: Comply with requirements in painting Sections for surface preparation and paint application.

3.02 IDENTIFICATION SCHEDULE

A. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.

1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.

2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.

B. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:
   a. Indoor Equipment: Adhesive film label Self-adhesive, engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
   b. Outdoor Equipment: Stenciled legend 4 inches (100 mm) high.
   c. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

2. Equipment to Be Labeled:
   a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be engraved, laminated acrylic or melamine label.
   b. Enclosures, disconnects and electrical cabinets.

END OF SECTION
SECTION 2609 23
LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY
A. Section Includes:
   1. Indoor occupancy sensors.
   2. Timeclock
B. Related Requirements:
   1. Section 262726 "Wiring Devices" for wall-box dimmers and manual light switches.

1.03 ACTION SUBMITTALS
A. Product Data: For each type of product.
B. Shop Drawings: Show installation details for occupancy sensors.
   1. Interconnection diagrams showing field-installed wiring.
   2. Include diagrams for power, signal, and control wiring.

1.04 CLOSEOUT SUBMITTALS
A. Operation and Maintenance Data: For each type of lighting control device to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.01 INDOOR OCCUPANCY SENSORS
A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Bryant Electric; a Hubbell company.
2. Cooper Industries, Inc.
3. Hubbell Building Automation, Inc.
5. Lightolier Controls.
6. Lithonia Lighting; Acuity Lighting Group, Inc.
7. Lutron Electronics Co., Inc.
8. NSi Industries LLC; TORK Products.
9. RAB Lighting.
10. Sensor Switch, Inc.
11. Square D; a brand of Schneider Electric.
12. Watt Stopper.

B. General Requirements for Sensors: Wall- or ceiling-mounted, solid-state indoor occupancy sensors with a separate power pack.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Operation: Unless otherwise indicated, turn lights on when coverage area is occupied, and turn them off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
3. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor is powered from the power pack.
4. Power Pack: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Sensor has 24-V dc, 150-mA, Class 2 power source, as defined by NFPA 70.
5. Mounting:
   a. Sensor: Suitable for mounting in any position on a standard outlet box.
   b. Relay: Externally mounted through a 1/2-inch (13-mm) knockout in a standard electrical enclosure.
   c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
6. Indicator: Digital display, to show when motion is detected during testing and normal operation of sensor.
7. Bypass Switch: Override the "on" function in case of sensor failure.

C. Dual-Technology Type: Ceiling mounted; detect occupants in coverage area using PIR and ultrasonic detection methods. The particular technology or combination of technologies that control on-off functions is selectable in the field by operating controls on unit.

1. Sensitivity Adjustment: Separate for each sensing technology.
2. Detector Sensitivity: Detect occurrences of 6-inch- (150-mm-) minimum movement of any portion of a human body that presents a target of not less than 36 sq. in. (232 sq. cm), and detect a person of average size and weight moving not less than 12 inches (305 mm) in either a horizontal or a vertical manner at an approximate speed of 12 inches/s (305 mm/s).
3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. (93 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.
2.02 TIMECLOCK

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper Industries, Inc.
2. Intermatic, Inc.
3. Invensys Controls.
5. NSi Industries LLC; TORK Products.
6. Tyco Electronics; ALR Brand.

B. Electronic Time Switches: Solid state, programmable, with alphanumeric display; complying with UL 917.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Contact Configuration: SPST
3. Contact Rating: 20-A ballast load, 120/277
4. Programs: Two on-off set points on a 24-hour schedule, allowing different set points for each day of the week and an annual holiday schedule that overrides the weekly operation on holidays.
5. Automatic daylight savings time changeover.
6. Battery Backup: Not less than seven days reserve, to maintain schedules and time clock.

2.03 CONDUCTORS AND CABLES

A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. Classes 2 and 3 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 22 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

C. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 16 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.01 SENSOR INSTALLATION

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.
B. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.02 WIRING INSTALLATION

A. Wiring Method: Comply with Section 260519 "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size is 1/2 inch (13 mm).

B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.

C. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.03 IDENTIFICATION

A. Identify components and power and control wiring according to Section 260553 "Identification for Electrical Systems."

   1. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.

3.04 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

   1. Operational Test: After installing sensors, and after electrical circuitry has been energized, start units to confirm proper unit operation.
   2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Lighting control devices will be considered defective if they do not pass tests and inspections.

3.05 ADJUSTING

A. Occupancy Adjustments: When requested within 6 months from date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual occupied conditions. Provide up to one visit to Project during other-than-normal occupancy hours for this purpose.

   1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.
3.06 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices.

END OF SECTION
SECTION 26 24 16

PANELBOARDS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Lighting and appliance branch-circuit panelboards.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of panelboard, switching and overcurrent protective device, transient voltage suppression device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
2. Detail enclosure types and details for types other than NEMA 250, Type 1.
3. Detail bus configuration, current, and voltage ratings.
4. Short-circuit current rating of panelboards and overcurrent protective devices.
5. Include evidence of NRTL listing for series rating of installed devices.
6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
7. Include wiring diagrams for power, signal, and control wiring (shunt trip breakers).

1.04 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 "Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.05 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. Keys: Two spares for each type of panelboard cabinet lock.

1.06 QUALITY ASSURANCE

A. Source Limitations: Obtain panelboards, overcurrent protective devices, components, and accessories from single source from single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with NEMA PB 1.

D. Comply with NFPA 70.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.

B. Handle and prepare panelboards for installation according to NEMA PB 1.

1.08 PROJECT CONDITIONS

A. Environmental Limitations:
   1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards 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.
   2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
      a. Ambient Temperature: Not exceeding 23 deg F (minus 5 deg C) to plus 104 deg F (plus 40 deg C).

B. Service Conditions: NEMA PB 1, usual service conditions, as follows:
1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet (2000 m).

C. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of electric service.
2. Do not proceed with interruption of electric service without Owner's written permission.
3. Comply with NFPA 70E.

1.09 COORDINATION

A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

B. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified with concrete.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS FOR PANELBOARDS

A. Enclosures: Surface-mounted cabinets.

1. Rated for environmental conditions at installed location.
   a. Indoor Dry and Clean Locations: NEMA 250, Type 1.

2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.

3. Finishes:
   a. Panels and Trim: Steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.


B. Phase, Neutral, and Ground Buses:
2. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.

C. Conductor Connectors: Suitable for use with conductor material and sizes.
   2. Main and Neutral Lugs: Mechanical type.
   3. Ground Lugs and Bus-Configured Terminators: Mechanical type.
   4. Subfeed (Double) Lugs: Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.

D. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

E. Panelboard Short-Circuit Current Rating: Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by an NRTL. Include size and type of allowable upstream and branch devices, listed and labeled for series-connected short-circuit rating by an NRTL.

2.02 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to SEI/ASCE 7.

   1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

2.03 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
   4. Square D; a brand of Schneider Electric.

B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

C. Mains: lugs only.

D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

E. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.
2.04 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
4. Square D; a brand of Schneider Electric.

B. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with series-connected rating to meet available fault currents.

2. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
3. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:
   a. Standard frame sizes, trip ratings, and number of poles.
   b. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
   c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
   d. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 55 percent of rated voltage.
   e. Multipole units enclosed in a single housing or factory assembled to operate as a single unit.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Receive, inspect, handle, and store panelboards according to NEMA PB 1.1.

B. Examine panelboards before installation. Reject panelboards that are damaged or rusted or have been subjected to water saturation.

C. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install panelboards and accessories according to NEMA PB 1.1.
B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.

C. Mount top of trim 72” above finished floor unless otherwise indicated.

D. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

E. Install overcurrent protective devices and controllers not already factory installed.
   1. Set field-adjustable, circuit-breaker trip ranges.

F. Install filler plates in unused spaces.

G. Stub four 1-inch (27-GRC) empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch (27-GRC) empty conduits into raised floor space or below slab not on grade.

H. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

I. Comply with NECA 1.

3.03 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Section 260553 "Identification for Electrical Systems."

B. Create a directory to indicate installed circuit loads; incorporate Owner's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

C. Provide new typed directories for any existing panel whose loads have been modified by this project. Where loads are remove, breaker shall be identified as “Spare”. Existing loads, not part of this project, shall only be identified as per existing directory. This project does not include tracing existing loads outside of project.

D. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.04 FIELD QUALITY CONTROL

A. Test and inspection:
   1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
   2. Test continuity of each circuit.

B. Panelboards will be considered defective if they do not pass tests and inspections.
3.05 ADJUSTING

A. Adjust moving parts and operable component to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION
SECTION 26 27 26

WIRING DEVICES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Isolated-ground receptacles.
3. Weather-resistant receptacles.
4. Snap switches.
5. 0-10V Dimmers
6. Cord and plug sets.

1.03 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Receptacles for Owner-Furnished Equipment: Match plug configurations.
2. Cord and Plug Sets: Match equipment requirements.

1.05 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.
PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers’ Names: Shortened versions (shown in parentheses) of the following manufacturers’ names are used in other Part 2 articles:

1. Cooper Wiring Devices; Division of Cooper Industries, Inc. (Cooper).
2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).

B. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.02 GENERAL WIRING-DEVICE REQUIREMENTS

A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

C. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:

1. Connectors shall comply with UL 2459 and shall be made with stranding building wire.
2. Devices shall comply with the requirements in this Section.

2.03 STRAIGHT-BLADE RECEPTACLES

A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Cooper; 5351 (single), CR5362 (duplex).
   b. Hubbell; HBL5351 (single), HBL5352 (duplex).
   c. Leviton; 5891 (single), 5352 (duplex).
   d. Pass & Seymour; 5361 (single), 5362 (duplex).
2.04 GFCI RECEPTACLES

A. General Description:

1. Straight blade, feed-through type.
2. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596.
3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.

B. Duplex GFCI Convenience Receptacles, 125 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Cooper; VGF20.
   b. Hubbell; GFR5352L.
   c. Pass & Seymour; 2095.
   d. Leviton; 7590.

2.05 CORD AND PLUG SETS

A. Description:

1. Match voltage and current ratings and number of conductors to requirements of equipment being connected.
2. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and ampacity of at least 130 percent of the equipment rating.

2.06 PENDANT CORD-CONNECTOR DEVICES

A. Description:

1. Matching, Straight blade plug and receptacle body connector.
2. NEMA WD 6 Configurations 5-20P and 5-20R, heavy-duty grade, and FS W-C-596.
4. External Cable Grip: Woven wire-mesh type made of high-strength, galvanized-steel wire strand, matched to cable diameter, and with attachment provision designed for corresponding connector.
5. Refer to installation detail for power data drops in classrooms.
2.07 TOGGLE SWITCHES

A. Comply with NEMA WD 1, UL 20, and FS W-S-896.

B. Switches, 120/277 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:

   Single Pole:
   1) Cooper; AH1221.
   2) Hubbell; HBL1221.
   3) Leviton; 1221-2.
   4) Pass & Seymour; CSB20AC1.

   Three Way:
   1) Cooper; AH1223.
   2) Hubbell; HBL1223.
   3) Leviton; 1223-2.
   4) Pass & Seymour; CSB20AC3.

   Four Way:
   1) Cooper; AH1224.
   2) Hubbell; HBL1224.
   3) Leviton; 1224-2.
   4) Pass & Seymour; CSB20AC4.

C. Dimmer Switches 0-10V:

1. Provide products compatible with LED light fixture drivers.
2. Slide dimmers with on/off control.

2.08 WALL PLATES

A. Single and combination types shall match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.

B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable cover.

2.09 FINISHES

A. Device Color:

1. Wiring Devices Connected to Normal Power System: As selected by Architect unless otherwise indicated or required by NFPA 70 or device listing.
B. Wall Plate Color: For plastic covers, match device color.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.

B. Coordination with Other Trades:

1. Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:
   a. Cut back and pigtail, or replace all damaged conductors.
   b. Straighten conductors that remain and remove corrosion and foreign matter.
   c. Pigtailing existing conductors is permitted, provided the outlet box is large enough.

D. Device Installation:

1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.

E. Receptacle Orientation:
   1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on bottom. Group adjacent switches under single, multigang wall plates.

3.02 GFCI RECEPTACLES
   A. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.

3.03 IDENTIFICATION
   A. Comply with Section 260553 "Identification for Electrical Systems."
   B. Identify each receptacle with panelboard identification and circuit number. Use durable machine printed labels.

3.04 FIELD QUALITY CONTROL
   A. Tests for Convenience Receptacles:
      1. Line Voltage: Acceptable range is 105 to 132 V.
      2. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
      3. Using the test plug, verify that the device and its outlet box are securely mounted.
   B. Wiring device will be considered defective if it does not pass tests and inspections.
   C. Prepare test and inspection reports.

END OF SECTION
SECTION 26 28 16
ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.01 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.

1.02 SUMMARY
A. Section Includes:
   1. Nonfusible switches.
   2. Enclosures.

1.03 DEFINITIONS
A. NC: Normally closed.
B. NO: Normally open.
C. SPDT: Single pole, double throw.

1.04 ACTION SUBMITTALS
A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers’ technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
   1. Enclosure types and details for types other than NEMA 250, Type 1.
   2. Current and voltage ratings.
   3. Short-circuit current ratings (interrupting and withstand, as appropriate).
   4. Include evidence of NRTL listing for series rating of installed devices.
   5. Detail features, characteristics, ratings, accessories, and auxiliary components.
B. Shop Drawings: For enclosed switches. Include plans, elevations, sections, details, and attachments to other work.
   1. Wiring Diagrams: For power, signal, and control wiring.
1.05 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.

1.06 QUALITY ASSURANCE

A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with NFPA 70.

1.07 PROJECT CONDITIONS

A. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:

1. Notify Owner no fewer than seven days in advance of proposed interruption of electric service.
2. Indicate method of providing temporary electric service.
3. Do not proceed with interruption of electric service without Construction Manager's written permission.
4. Comply with NFPA 70E.

1.08 COORDINATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.01 NONFUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
4. Square D; a brand of Schneider Electric.

B. Type HD, Heavy Duty, Single Throw, 240-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:
1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.02 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
2. Outdoor Locations: NEMA 250, Type 3R.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches for compliance with installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

C. Comply with NECA 1.

3.03 IDENTIFICATION

A. Comply with requirements in Section 260553 "Identification for Electrical Systems."
1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.04 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION
SECTION 26 51 00

INTERIOR LIGHTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Interior lighting fixtures, lamps, and ballasts.
2. Emergency lighting units.
3. Exit signs.
4. Lighting fixture supports.

B. Related Sections:

1. Section 260923 "Lighting Control Devices" for automatic control of lighting, including time switches and occupancy sensors.

1.03 DEFINITIONS

A. BF: Ballast factor.
B. CCT: Correlated color temperature.
C. CRI: Color-rendering index.
D. HID: High-intensity discharge.
E. LER: Luminaire efficacy rating.
F. Lumen: Measured output of lamp and luminaire, or both.
G. Luminaire: Complete lighting fixture, including ballast housing if provided.

1.04 ACTION SUBMITTALS

A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:
1. Physical description of lighting fixture including dimensions.
2. Emergency lighting units including battery and charger.
3. Ballast, including BF.
5. Life, output (lumens, CCT, and CRI), and energy-efficiency data for lamps.

B. Installation instructions.

1.05 CLOSEOUT SUBMITTALS

A. Utility Rebate Data: To verify energy efficiency measures.
   1. Provide copies of shipping lists for all qualifying fixtures, lamps and ballasts.

B. Operation and Maintenance Data: For lighting equipment and fixtures to include in emergency, operation, and maintenance manuals.
   1. Provide a list of all lamp types used on Project; use ANSI and manufacturers' codes.

1.06 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. Lamps: 10 for every 100 of each type and rating installed. Furnish at least one of each type.
   2. Ballasts: One for every 100 of each type and rating installed. Furnish at least one of each type.

1.07 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

1.08 COORDINATION

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1.09 WARRANTY

A. Special Warranty for Emergency Lighting Batteries: Manufacturer's standard form in which manufacturer of battery-powered emergency lighting unit agrees to repair or replace
components of rechargeable batteries that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Emergency Fluorescent Ballast and Self-Powered Exit Sign Batteries: Seven years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining six years.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide product indicated on Drawings.

2.02 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.

B. Fluorescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5 and NEMA LE 5A as applicable.

C. Metal Parts: Free of burrs and sharp corners and edges.

D. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.

E. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

F. Diffusers and Globes:

1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
   
a. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.
   
b. UV stabilized.

G. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps and ballasts. Labels shall be located where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

1. Label shall include the following lamp and ballast characteristics:
   
a. "USE ONLY" and include specific lamp type.
b. Lamp diameter code (T-4, T-5, T-8, T-12, etc.), tube configuration (twin, quad, triple, etc.), base type, and nominal wattage for fluorescent and compact fluorescent luminaires.

c. Lamp type, wattage, bulb type (ED17, BD56, etc.) and coating (clear or coated) for HID luminaires.

d. Start type (preheat, rapid start, instant start, etc.) for fluorescent and compact fluorescent luminaires.

e. ANSI ballast type (M98, M57, etc.) for HID luminaires.

2.03 GENERAL REQUIREMENTS FOR LED LUMINAIREs

A. Performance:

1. Color temperature shall be 5000-6000 Kelvin (Exterior Fixtures Mounted to Building) and 4000-5000 Kelvin (Interior Fixtures).
2. CRI shall be 65 minimum.
3. Shall have a minimum of 100,000 L70 hours at 25°C
4. Minimum Efficacy 70 lumens/watt.

B. Construction:

1. Shall be universal voltage 120V-277V at 60 Hz.
2. Luminaires shall have surge protection to meet C Low waveforms as defined in ANSI/IEEE C62.41.2, Scenario I Location Category C.
3. Thermal management shall be passive by design and shall consist of heat sinks with no fans, pumps, or liquids. Shall provide direct heat exchange between the LED light engine and cool outdoor air by drawing heat through integral heat channels and out to the sculptured surface.
4. Driver: UL Listed, Power Factor > 90% and THD < 20% at full load; Complies with FCC rules and regulations, Title 47 CFR Part 15 Non Consumer (Class A), 100,000 hours expected life (< 0.5% failure at 100,000 hours of operation in 25°C ambient)
5. Suitable to operate in -40°C to +40°C ambient environments (Battery back-up to 0°C)
6. Minimum 70% recyclable content (by weight)
7. Luminaires that require remote mounting of any component need for operation – such as ballasts, drivers, light engines electronics, or other controls – are not allowed. Components needed to make the fixture operational shall be integral to the fixture housing.

C. Testing:

1. Luminaires shall be fully functional after testing for thermal shock according to IEC 60068-2-14 and be fully functional after testing.
2. Luminaires shall be tested according to IEC 60068-2-30, damp heat, steady state, for high humidity and high temperatures and be fully functional after testing.

D. Compliance:

1. Meets Buy American requirements within the ARRA
2. UL Listed for Wet Locations (Building Exterior Applications)
3. RoHS Compliant
4. International Dark Sky Association (IDA) approved (Building Exterior Applications), or shall meet the following IESNA TM-15 BUG ratings:
   a. Maximum uplight (U) of U1.
   b. Maximum glare (g) rating equal to G2.
5. Manufactured in an ISO9001 facility

E. Experience:
   1. Minimum four years LED luminaire manufacturing experience and 4,000 installed LED projects

2.04 BALLASTS FOR LINEAR FLUORESCENT LAMPS

A. General Requirements for Electronic Ballasts:
   1. Comply with UL 935 and with ANSI C82.11.
   2. Designed for type and quantity of lamps served.
   3. Ballasts shall be designed for full light output unless another BF, dimmer, or bi-level control is indicated.
   4. Sound Rating: Class A.
   5. Total Harmonic Distortion Rating: Less than 10 percent.
   6. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
   7. Operating Frequency: 42 kHz or higher.
   8. Lamp Current Crest Factor: 1.7 or less.
   9. BF: as indicated.
   10. Power Factor: 0.95 or higher.
   11. NEMA Premium Ballast labeled
   12. Parallel Lamp Circuits: Multiple lamp ballasts shall comply with ANSI C82.11 and shall be connected to maintain full light output on surviving lamps if one or more lamps fail.

B. Luminaires controlled by occupancy sensors shall have programmed-start ballasts.

C. Electronic Programmed-Start Ballasts for T8 Lamps: Comply with ANSI C82.11 and the following:
   1. Lamp end-of-life detection and shutdown circuit for T5 diameter lamps.
   2. Automatic lamp starting after lamp replacement.

2.05 EXIT SIGNS

A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

B. Internally Lighted Signs:
   1. Lamps for AC Operation: Fluorescent, two for each fixture, 20,000 hours of rated lamp life.
2. Lamps for AC Operation: LEDs, 50,000 hours minimum rated lamp life.
3. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.
   a. Battery: Sealed, maintenance-free, nickel-cadmium type.
   b. Charger: Fully automatic, solid-state type with sealed transfer relay.
   c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
   d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
   e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
   f. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

2.06 EMERGENCY LIGHTING UNITS

A. General Requirements for Emergency Lighting Units: Self-contained units complying with UL 924.
   1. Battery: Sealed, maintenance-free, lead-acid type.
   2. Charger: Fully automatic, solid-state type with sealed transfer relay.
   3. 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.
   4. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
   5. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.
   6. Wire Guard: Heavy-chrome-plated wire guard protects lamp heads or fixtures.
   7. Integral Self-Test: Factory-installed electronic device automatically initiates code-required test of unit emergency operation at required intervals. Test failure is annunciated by an integral audible alarm and a flashing red LED.

2.07 FLUORESCENT LAMPS

A. T8 rapid-start lamps, rated 28 W maximum, nominal length of 48 inches (1220 mm), 2800 initial lumens (minimum), CRI 80 (minimum), color temperature 3500 K, and average rated life 20,000 hours unless otherwise indicated.
2.08 LIGHTING FIXTURE SUPPORT COMPONENTS

A. Comply with Section 260529 "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.

B. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).

PART 3 - EXECUTION

3.01 INSTALLATION

A. Lighting fixtures:
   1. Set level, plumb, and square with ceilings and walls unless otherwise indicated.
   2. Install lamps in each luminaire.

B. Temporary Lighting: If it is necessary, and approved by Architect, to use permanent luminaires for temporary lighting, install and energize the minimum number of luminaires necessary. When construction is sufficiently complete, remove the temporary luminaires, disassemble, clean thoroughly, install new lamps, and reinstall.

C. Lay-in Ceiling Lighting Fixtures Supports: Use grid as a support element.
   1. Install ceiling support system rods or wires, independent of the ceiling suspension devices, for each fixture. Locate not more than 6 inches (150 mm) from lighting fixture corners.
   2. Support Clips: Fasten to lighting fixtures and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application.
   3. Install at least one independent support rod or wire from structure to a tab on lighting fixture. Wire or rod shall have breaking strength of the weight of fixture at a safety factor of 3.

D. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.02 IDENTIFICATION

A. Install labels with panel and circuit numbers on concealed junction and outlet boxes. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.03 FIELD QUALITY CONTROL

A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.
3.04 STARTUP SERVICE

A. Burn-in all lamps that require specific aging period to operate properly, prior to occupancy by Owner. Burn-in fluorescent and compact fluorescent lamps intended to be dimmed, for at least 100 hours at full voltage.

3.05 ADJUSTING

A. Occupancy Adjustments: When requested within 6 months of date of Substantial Completion, provide on-site assistance in adjusting aimable luminaires to suit actual occupied conditions. Provide up to one visit to Project during other-than-normal occupancy hours for this purpose. Some of this work may be required after dark.

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CABLE TRAYS FOR COMMUNICATIONS SYSTEMS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Ladder cable trays.

1.03 ACTION SUBMITTALS

A. Product Data: For each type of cable tray.

1. Include data indicating dimensions and finishes for each type of cable tray indicated.

B. Shop Drawings: For each type of cable tray.

1. Show fabrication and installation details of cable trays, including plans, elevations, and sections of components and attachments to other construction elements. Designate components and accessories, including clamps, brackets, hanger rods, splice-plate connectors, expansion-joint assemblies, straight lengths, and fittings.

PART 2 - PRODUCTS

2.01 GENERAL REQUIREMENTS FOR CABLE TRAYS

A. Cable Trays and Accessories: Identified as defined in NFPA 70 and marked for intended location, application, and grounding.

1. Source Limitations: Obtain cable trays and components from single manufacturer.

B. Sizes and Configurations: See the Cable Tray Schedule on Drawings for specific requirements for types, materials, sizes, and configurations.

C. Structural Performance: See articles for individual cable tray types for specific values for the following parameters:
1. Uniform Load Distribution: Capable of supporting a uniformly distributed load on the indicated support span when supported as a simple span and tested according to NEMA VE 1.
2. Concentrated Load: A load applied at midpoint of span and centerline of tray.
3. Load and Safety Factors: Applicable to both side rails and rung capacities.

2.02 LADDER CABLE TRAYS

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. Allied Tube & Conduit; a Tyco International Ltd. Co.
2. Chalfant Manufacturing Company.
3. Cooper B-Line, Inc.
5. MP Husky.
6. Niedax-Kleinhuis USA, Inc.

B. Description:

1. Configuration: Two I-beam side rails with transverse rungs welded to side rails.
2. Rung Spacing: 9 inches (225 mm) o.c.
3. Radius-Fitting Rung Spacing: 9 inches (225 mm) at center of tray's width.
4. Minimum Cable-Bearing Surface for Rungs: 7/8-inch (22-mm) width with radius edges.
5. No portion of the rungs shall protrude below the bottom plane of side rails.
6. Structural Performance of Each Rung: Capable of supporting a maximum cable load, with a safety factor of 1.5, plus a 200-lb (90-kg) concentrated load, when tested according to NEMA VE 1.
7. Minimum Usable Load Depth: 4 inches (100 mm)
8. Width: 18 inches (450 mm) unless otherwise indicated on Drawings.
9. Fitting Minimum Radius: 12 inches (300 mm)
10. Class Designation: Comply with NEMA VE 1, Class 12B
11. Splicing Assemblies: Bolted type using serrated flange locknuts.
12. Hardware and Fasteners: Steel, zinc plated according to ASTM B 633.
13. Splice Plate Capacity: Splices located within support span shall not diminish rated loading capacity of cable tray.

2.03 MATERIALS AND FINISHES

A. Steel:

1. Straight Section and Fitting Side Rails and Rungs: Steel complies with the minimum mechanical properties of ASTM A 1008/A 1008M, Grade 33, Type 2.
2. Steel Tray Splice Plates: ASTM A 1011/A 1011M, HSLAS, Grade 50, Class 1.
3. Fasteners: Steel complies with the minimum mechanical properties of ASTM A 510/A 510M, Grade 1008.

2.04 CABLE TRAY ACCESSORIES

A. Fittings: Tees, crosses, risers, elbows, and other fittings as indicated, of same materials and finishes as cable tray.

B. Cable tray supports and connectors, including bonding jumpers, as recommended by cable tray manufacturer.

2.05 SOURCE QUALITY CONTROL

A. Testing: Test and inspect cable trays according to NEMA VE 1.

PART 3 - EXECUTION

3.01 CABLE TRAY INSTALLATION

A. Install cable trays according to NEMA VE 2.

B. Install cable trays as a complete system, including fasteners, hold-down clips, support systems, barrier strips, adjustable horizontal and vertical splice plates, elbows, reducers, tees, crosses, cable dropouts, adapters, covers, and bonding.

C. Install cable trays so that the tray is accessible for cable installation and all splices are accessible for inspection and adjustment.

D. Remove burrs and sharp edges from cable trays.

E. Fasten cable tray supports to building structure.

F. Construct supports from channel members, threaded rods, and other appurtenances furnished by cable tray manufacturer. Arrange supports in trapeze or wall-bracket form as required by application.

G. Support bus assembly to prevent twisting from eccentric loading.

H. Install center-hung supports for single-rail trays designed for 60 versus 40 percent eccentric loading condition, with a safety factor of 3.

I. Locate and install supports according to NEMA VE 2. Do not install more than one cable tray splice between supports.

J. Make connections to equipment with flanged fittings fastened to cable trays and to equipment. Support cable trays independent of fittings. Do not carry weight of cable trays on equipment enclosure.
K. Make changes in direction and elevation using manufacturer's recommended fittings.

L. Make cable tray connections using manufacturer's recommended fittings.

M. Seal penetrations through fire and smoke barriers. Comply with requirements in Division 07 "Penetration Firestopping."

N. Install cable trays with enough workspace to permit access for installing cables.

3.02 CABLE TRAY GROUNDING

A. Ground cable trays according to NFPA 70 unless additional grounding is specified. Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

B. Cable trays with communications cable shall be bonded together with splice plates listed for grounding purposes or with listed bonding jumpers.

3.03 CABLE INSTALLATION

A. Install cables only when each cable tray run has been completed and inspected.

B. Fasten cables on horizontal runs with cable clamps or cable ties according to NEMA VE 2. Tighten clamps only enough to secure the cable, without indenting the cable jacket. Install cable ties with a tool that includes an automatic pressure-limiting device.

C. Fasten cables on vertical runs to cable trays every 18 inches (450 mm).

D. Tie MI cables down every 36 inches (900 mm) where required to provide a 2-hour fire rating and every 72 inches (1800 mm) elsewhere.

3.04 CONNECTIONS

A. Connect pathways to cable trays according to requirements in NEMA VE 2 and NEMA FG 1.

3.05 PROTECTION

A. Protect installed cable trays and cables.

1. Install temporary protection for cables in open trays to safeguard exposed cables against falling objects or debris during construction. Temporary protection for cables and cable tray can be constructed of wood or metal materials and shall remain in place until the risk of damage is over.

2. Repair damage to galvanized finishes with zinc-rich paint recommended by cable tray manufacturer.
3. Repair damage to paint finishes with matching touchup coating recommended by cable tray manufacturer.

END OF SECTION
MCC 13-17 Temporary Kitchen Classroom Renovation at MCC

SECTION 27 13 00

COMMUNICATIONS BACKBONE CABLING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Pathways.
2. UTP cable.
3. 62.5/125-micrometer, optical fiber cabling.
5. Cable connecting hardware, patch panels, and cross-connects.

1.03 DEFINITIONS

B. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.
C. EMI: Electromagnetic interference.
D. IDC: Insulation displacement connector.
E. LAN: Local area network.
F. RCDD: Registered Communications Distribution Designer.
G. UTP: Unshielded twisted pair.

1.04 BACKBONE CABLEING DESCRIPTION

A. Backbone cabling system shall provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in the telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and...
main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.

B. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities. Bridged taps and splitters shall not be used as part of backbone cabling.

1.05 PERFORMANCE REQUIREMENTS

A. General Performance: Backbone cabling system shall comply with transmission standards in TIA/EIA-568-C.1, when tested according to test procedures of this standard.

1.06 ACTION SUBMITTALS

A. Shop Drawings:

1. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by Owner.
2. System Labeling Schedules: Electronic copy of labeling schedules that are part of the cabling and asset identification system of the software.
3. Cabling administration drawings and printouts.
4. Wiring diagrams to show typical wiring schematics including the following:
   b. Patch panels.
   c. Patch cords.
5. Cross-connects and patch panels. Detail mounting assemblies, and show elevations and physical relationship between the installed components.

1.07 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

B. Maintenance Data: For splices and connectors to include in maintenance manuals.

1.08 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. Patch-Panel Units: One of each type.
2. Connecting Blocks: One of each type.

1.09 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.
1. Layout Responsibility: Preparation of Shop Drawings by an RCDD.

B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Flame-Spread Index: 25 or less.
   2. Smoke-Developed Index: 50 or less.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.


1.10 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install cables and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.11 COORDINATION

A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

PART 2 - PRODUCTS

2.01 PATHWAYS

A. General Requirements: Comply with TIA/EIA-569-A.

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.
   1. Support brackets with cable tie slots for fastening cable ties to brackets.
   2. Lacing bars, spools, J-hooks, and D-rings.
   3. Straps and other devices.

C. Fiber optic cable innerduct:
   1. Provide UL listed (for plenum use) orange, corrugated innerduct for all fiber optic cabling.
   2. 1” Diameter
2.02 BACKBOARDS

A. Backboards: Plywood, 3/4 by 48 by 96 inches (19 by 1220 by 2440 mm). Comply with requirements in Division 06"Rough Carpentry" for plywood backing panels.

2.03 UTP CABLE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Belden CDT Inc.; Electronics Division.
2. Berk-Tek; a Nexans company.
3. CommScope, Inc.
4. Draka USA.
5. Genesis Cable Products; Honeywell International, Inc.
6. KRONE Incorporated.
7. Mohawk; a division of Belden CDT.
8. Nordex/CDT; a subsidiary of Cable Design Technologies.
9. Superior Essex Inc.
10. SYSTIMAX Solutions; a CommScope Inc. brand.
11. 3M.
12. Tyco Electronics/AMP Netconnect; Tyco International Ltd.

B. Description: 100-ohm, 25-pair UTP, formed into 25-pair binder groups covered with a gray thermoplastic jacket.

1. Comply with ICEA S-90-661 for mechanical properties.
2. Comply with TIA/EIA-568-C.1 for performance specifications.
3. Comply with TIA/EIA-568-C.2, Category 5e.
4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:

a. Communications, Plenum Rated: Type CMP or MPP, complying with NFPA 262.

2.04 UTP CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

2. Dynacom Corporation.
3. Hubbell Premise Wiring.
4. KRONE Incorporated.
5. Leviton Voice & Data Division.
6. Molex Premise Networks; a division of Molex, Inc.
7. Nordex/CDT; a subsidiary of Cable Design Technologies.
8. Panduit Corp.
10. **Tyco Electronics/AMP Netconnect; Tyco International Ltd.**

B. **General Requirements for Cable Connecting Hardware:** Comply with TIA/EIA-568-C.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.

C. **Connecting Blocks:** 110-style IDC for Category 6. Provide blocks for the number of cables terminated on the block, plus 25 percent spare. Integral with connector bodies, including plugs and jacks where indicated.

D. **Cross-Connect:** Modular array of connecting blocks arranged to terminate building cables and permit interconnection between cables.
   1. **Number of Terminals per Field:** One for each conductor in assigned cables.

E. **Patch Panel:** Modular panels housing multiple-numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables.
   1. **Number of Jacks per Field:** One for each four-pair UTP cable indicated] [conductor group of indicated cables, plus spares and blank positions adequate to suit specified expansion criteria.

F. **Jacks and Jack Assemblies:** Modular, color-coded, eight-position modular receptacle units with integral IDC-type terminals.

G. **Patch Cords:** Factory-made, 4-pair cables in 36-inch (900-mm) lengths; terminated with 8-position modular plug at each end.
   1. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure Category 6 performance. Patch cords shall have latch guards to protect against snagging.
   2. Patch cords shall have color-coded boots for circuit identification.

### 2.05 OPTICAL FIBER CABLE

A. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
   1. Berk-Tek; a Nexans company.
   2. CommScope, Inc.
   3. Corning Cable Systems.
   4. General Cable Technologies Corporation.
   5. Mohawk; a division of Belden CDT.
   6. Nordex/CDT; a subsidiary of Cable Design Technologies.
   7. Optical Connectivity Solutions Division; Emerson Network Power.
   8. Superior Essex Inc.
   9. SYSTIMAX Solutions; a CommScope Inc. brand.
   10. 3M.
   11. Tyco Electronics/AMP Netconnect; Tyco International Ltd.
B. Description: Multimode, 62.5/125-micrometer, 6-fiber, nonconductive, tight buffer, optical fiber cable.

1. Comply with ICEA S-83-596 for mechanical properties.
2. Comply with TIA/EIA-492AAAA-A for detailed specifications.
3. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:
   a. General Purpose, Nonconductive: Type OFN or OFNG.
   b. Plenum Rated, Nonconductive: Type OFNP, complying with NFPA 262.
4. Maximum Attenuation: 3.50 dB/km at 850 nm; 1.5 dB/km at 1300 nm.
5. Minimum Modal Bandwidth: 160 MHz-km at 850 nm; 500 MHz-km at 1300 nm.

C. Jacket:

2. Cable cordage jacket, fiber, unit, and group color shall be according to TIA/EIA-598-B.
3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches (1000 mm).

2.06 OPTICAL FIBER CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ADC.
3. Berk-Tek; a Nexans company.
4. Corning Cable Systems.
5. Dynacom Corporation.
6. Hubbell Premise Wiring.
7. Molex Premise Networks; a division of Molex, Inc.
8. Nordex/CDT; a subsidiary of Cable Design Technologies.
9. Optical Connectivity Solutions Division; Emerson Network Power.
10. Siemon Co. (The).

B. Cross-Connects and Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors.

1. Number of Connectors per Field: One for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to suit specified expansion criteria.

C. Patch Cords: Factory-made, dual-fiber cables in 36-inch (900-mm) lengths.

D. Cable Connecting Hardware:

2. Quick-connect, simplex and duplex, Type SC connectors. Insertion loss not more than 0.75 dB.
2.07 GROUNDING
   A. Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems" for grounding conductors and connectors.
   B. Comply with ANSI-J-STD-607-A.

2.08 IDENTIFICATION PRODUCTS
   A. Comply with TIA/EIA-606-A and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

PART 3 - EXECUTION

3.01 ENTRANCE FACILITIES
   A. Coordinate backbone cabling with the protectors and demarcation point provided by communications service provider.

3.02 WIRING METHODS
   A. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces, in attics, where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.
      1. Install plenum cable in environmental air spaces, including plenum ceilings.
      2. Comply with requirements for raceways and boxes specified in Section 260533 "Raceway and Boxes for Electrical Systems."
   B. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.
   C. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

3.03 INSTALLATION OF PATHWAYS
   A. Cable Trays: Comply with NEMA VE 2 and TIA/EIA-569-A.
   B. Comply with requirements for demarcation point, pathways, cabinets, and racks specified in Section 271100 "Communications Equipment Room Fittings." Drawings indicate general arrangement of pathways and fittings.
   C. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.
D. Comply with requirements in Section 260533 "Raceway and Boxes for Electrical Systems" for installation of conduits and wireways.

E. Install manufactured conduit sweeps and long-radius elbows whenever possible.

F. Pathway Installation in Communications Equipment Rooms:
   1. Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed, or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.
   2. Install cable trays to route cables if conduits cannot be located in these positions.
   3. Secure conduits to backboard when entering room from overhead.
   4. Extend conduits 3 inches (76 mm) above finished floor.
   5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

G. Backboards: Install backboards with 96-inch (2440-mm) dimension vertical. Butt adjacent sheets tightly, and form smooth gap-free corners and joints.

3.04 INSTALLATION OF CABLES

A. Comply with NECA 1.

B. General Requirements for Cabling:
   2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
   3. Install 110-style IDC termination hardware unless otherwise indicated.
   4. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
   5. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
   6. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
   7. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Use lacing bars and distribution spools.
   8. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
   9. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
   10. In the communications equipment room, install a 10-foot- (3-m-) long service loop on each end of cable.
   11. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.

C. UTP Cable Installation:
2. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.

D. Optical Fiber Cable Installation:
2. Cable may be terminated on connecting hardware that is rack or cabinet mounted.

E. Open-Cable Installation:
1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend UTP cable not in a wireway or pathway, a minimum of 8 inches (200 mm) above ceilings by cable supports not more than 60 inches (1524 mm) apart.
3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

F. Group connecting hardware for cables into separate logical fields.

G. Separation from EMI Sources:
1. Comply with BICSI TDMM and TIA/EIA-569-A recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
   a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
   b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).
   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (610 mm).
3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
   a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).
   b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).
   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (300 mm).
4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (76 mm).

c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).

5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).

6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).

3.05 FIRESTOPPING

A. Comply with requirements in Division 07 "Penetration Firestopping."

B. Comply with TIA/EIA-569-A, Annex A, "Firestopping."

C. Comply with BICSI TDMM, "Firestopping Systems" Article.

3.06 GROUNDING

A. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.

B. Comply with ANSI-J-STD-607-A.

C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar.

D. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.07 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

1. Match existing identification system.

2. Color-code cross-connect fields and apply colors to voice and data service backboards, connections, covers, and labels.

B. Comply with requirements in Division 09 "Interior Painting" for painting backboards. For fire-resistant plywood, do not paint over manufacturer's label.

C. Comply with requirements in Section 271500 "Communications Horizontal Cabling" for cable and asset management software.
D. Cable Schedule: Install in a prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.

E. Cable and Wire Identification:

1. Label each cable within 4 inches (100 mm) of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
2. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet (4.5 m).
4. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
   a. Individually number wiring conductors connected to terminal strips and identify each cable or wiring group being extended from a panel or cabinet to a building-mounted device with name and number of particular device as shown.
   b. Label each unit and field within distribution racks and frames.
5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.

F. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA/EIA 606-A, for the following:

1. Cables use flexible vinyl or polyester that flexes as cables are bent.

3.08 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Visually inspect UTP and optical fiber jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA/EIA-568-C.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Test UTP copper cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.
   a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-C.2. Perform tests with a tester that complies with performance...
requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

4. Optical Fiber Cable Tests:
   a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-C.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
   b. Link End-to-End Attenuation Tests:
      1) Horizontal and multimode backbone link measurements: Test at 850 or 1300 nm in 1 direction according to TIA/EIA-526-14-A, Method B, One Reference Jumper.
      2) Attenuation test results for backbone links shall be less than 2.0 dB. Attenuation test results shall be less than that calculated according to equation in TIA/EIA-568-C.1.

C. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.

D. Remove and replace cabling where test results indicate that they do not comply with specified requirements.

E. End-to-end cabling will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

END OF SECTION
SECTION 27 15 00

COMMUNICATIONS HORIZONTAL CABLEING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. UTP cabling - Existing to be relocated, terminated and tested
2. Cable connecting hardware, patch panels, and cross-connects.
3. Telecommunications outlet/connectors.
4. Cabling system identification products.
5. Cable management system.

1.03 DEFINITIONS


B. Consolidation Point: A location for interconnection between horizontal cables extending from building pathways and horizontal cables extending into furniture pathways.

C. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.

D. EMI: Electromagnetic interference.

E. IDC: Insulation displacement connector.

F. LAN: Local area network.

G. MUTOA: Multiuser telecommunications outlet assembly, a grouping in one location of several telecommunications outlet/connectors.

H. Outlet/Connectors: A connecting device in the work area on which horizontal cable or outlet cable terminates.

I. RCDD: Registered Communications Distribution Designer.

J. UTP: Unshielded twisted pair.
1.04 ADMINISTRATIVE REQUIREMENTS
   A. Coordinate layout and installation of telecommunications cabling with Owner's telecommunications and LAN equipment and service suppliers.
   B. Coordinate telecommunications outlet/connector locations with location of power receptacles at each work area.

1.05 ACTION SUBMITTALS
   A. Product Data: For each type of product.

1.06 INFORMATIONAL SUBMITTALS
   A. Field quality-control reports.

1.07 CLOSEOUT SUBMITTALS
   A. Maintenance Data: For splices and connectors to include in maintenance manuals.

PART 2 - PRODUCTS

2.01 PERFORMANCE REQUIREMENTS
   A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA/EIA-568-B.1 when tested according to test procedures of this standard.
   B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   C. Grounding: Comply with J-STD-607-A.

2.02 UTP CABLE
   A. Cable is existing and to be relocated.

2.03 UTP CABLE HARDWARE
   A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1. ADC.
      3. Belden Inc.
4. Dynacom Inc.
5. Hubbell Premise Wiring.
6. Leviton Commercial Networks Division.
7. Molex Premise Networks; a division of Molex, Inc.
8. Panduit Corp.
10. Tyco Electronics Corporation; AMP Products.

B. General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-B.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.

C. Jacks and Jack Assemblies: Modular, color-coded, eight-position modular receptacle units with integral IDC-type terminals.

2.04 HDMI CABLE

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. Cables to Go.
2. Tripp-Lite.
3. Pro-Techgroup.

B. Cable Characteristics: Factory assembled HDMI cable with terminal connectors installed in lengths required. Cable shall meet HDMI 1.4 standard, allowing HD video, audio, and data in a single cable with transfer rates up to 100 Mbps.

2.05 HDMI CABLE HARDWARE

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. Steren.
2. Calrad Electronics.

B. Modular 1-gang, faceplate, stainless steel with gold contact, keystone inserts, female to female HDMI connector.

2.06 TELECOMMUNICATIONS OUTLET/CONNECTORS


B. Workstation Outlets: Four-port-connector assemblies mounted in single faceplate.
1. Plastic Faceplate: High-impact plastic. Coordinate color with Section 262726 "Wiring Devices."
2. For use with snap-in jacks accommodating any combination of UTP, optical fiber, and coaxial work area cords.

2.07 IDENTIFICATION PRODUCTS

A. Comply with TIA/EIA-606-A and UL 969 for labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

B. Comply with requirements in Section 260553 "Identification for Electrical Systems."

PART 3 - EXECUTION

3.01 WIRING METHODS

A. Install cables in pathways and bridle rings except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces and in gypsum board partitions where unenclosed wiring method may be used.

B. Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

C. Wiring within Enclosures:

1. Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.
2. Install lacing bars and distribution spools.
3. Install conductors parallel with or at right angles to sides and back of enclosure.

3.02 INSTALLATION OF CABLES

A. Comply with NECA 1.

B. General Requirements for Cabling:

2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
3. Install 110-style IDC termination hardware unless otherwise indicated.
4. Terminate conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
5. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
C. UTP Cable Installation:
   2. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.

D. Open-Cable Installation:
   1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
   2. Suspend UTP cable not in a wireway or pathway a minimum of 8 inches (200 mm) above ceilings by cable supports not more than 60 inches (1524 mm) apart.
   3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

E. Separation from EMI Sources:
   1. Comply with BICSI TDMM and TIA-569-B for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
   2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
      a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
      b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).
      c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (610 mm).
   3. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).
   4. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).

3.03 FIRESTOPPING

A. Comply with requirements in Division 07 "Penetration Firestopping."

B. Comply with TIA-569-B, Annex A, "Firestopping."

C. Comply with BICSI TDMM, "Firestopping Systems" Article.

3.04 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
1. Color-code cross-connect fields. Apply colors to voice and data service backboards, connections, covers, and labels.

B. Cable and Wire Identification:

1. Label each cable within 4 inches (100 mm) of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
2. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet (4.5 m).
4. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
   a. Individually number wiring conductors connected to terminal strips, and identify each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with name and number of particular device as shown.
   b. Label each unit and field within distribution racks and frames.
5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.
6. Uniquely identify and label work area cables extending from the MUT0 to the work area. These cables may not exceed the length stated on the MUT0 label.

C. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA/EIA-606-A.

1. Cables use flexible vinyl or polyester that flex as cables are bent.

3.05 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. UTP Performance Tests:
   a. Test for each outlet and MUT0. Perform the following tests according to TIA/EIA-568-B.1 and TIA/EIA-568-B.2:
      1) Wire map.
      2) Length (physical vs. electrical, and length requirements).
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3) Insertion loss.
4) Near-end crosstalk (NEXT) loss.
5) Power sum near-end crosstalk (PSNEXT) loss.
6) Equal-level far-end crosstalk (ELFEXT).
7) Power sum equal-level far-end crosstalk (PSELFEXT).
8) Return loss.
9) Propagation delay.
10) Delay skew.

4. Final Verification Tests: Perform verification tests for UTP systems after the complete communications cabling and workstation outlet/connectors are installed.

   a. Voice Tests: These tests assume that dial tone service has been installed. Connect to the network interface device at the demarcation point. Go off-hook and listen and receive a dial tone. If a test number is available, make and receive a local, long distance, and digital subscription line telephone call.

   b. Data Tests: These tests assume the Information Technology Staff has a network installed and is available to assist with testing. Connect to the network interface device at the demarcation point. Log onto the network to ensure proper connection to the network.

B. Document data for each measurement. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.

C. End-to-end cabling will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

END OF SECTION
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DIVISION 28 - FIRE ALARM

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SECTION 28 31 11
DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY
A. Fire alarm system (existing Notifier fire alarm system with voice evacuation) design and installation to the extent necessary to accommodate renovation plan, including all component, wiring and conduit.
B. Replacement and removal of existing fire alarm components, wiring and conduit indicated.
C. Maintenance of new fire alarm system devices (including existing devices which are to be re-used) under contract for specified warranty period.
D. Section Includes:
   1. System smoke detectors.
   3. Addressable interface device.

1.03 DEFINITIONS
A. EMT: Electrical Metallic Tubing.
B. FACP: Fire Alarm Control Panel.
C. HLI: High Level Interface.
E. PC: Personal computer.
F. VESDA: Very Early Smoke-Detection Apparatus.

1.04 ACTION SUBMITTALS
A. Product Data: For each type of product, including furnished options and accessories.
1. Include construction details, material descriptions, dimensions, profiles, and finishes.
2. Include rated capacities, operating characteristics, and electrical characteristics.

B. Shop Drawings: For fire-alarm system.
   1. Comply with recommendations and requirements in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
   2. Include plans, elevations, sections, details, and attachments to other work.
   3. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.
   4. Detail assembly and support requirements.
   5. Include voltage drop calculations for notification-appliance circuits.
   6. Include input/output matrix.
   7. Include statement from manufacturer that all equipment and components have been tested as a system and meet all requirements in this Specification and in NFPA 72.
   8. Include performance parameters and installation details for each detector.
   9. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams.

C. General Submittal Requirements:
   1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect.
   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 with experience designing fire alarm systems in the jurisdictional area.

1.05 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

B. Sample Warranty: For special warranty.

1.06 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.

   1. In addition to items specified in Division 01 "Operation and Maintenance Data," include the following and deliver copies to authorities having jurisdiction:
      a. Comply with the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
b. Provide "Fire Alarm and Emergency Communications System Record of Completion Documents" according to the "Completion Documents" Article in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.

c. Complete wiring diagrams showing connections between all devices and equipment. Each conductor shall be numbered at every junction point with indication of origination and termination points.

d. Riser diagram.

e. Device addresses.

f. Record copy of site-specific software.

g. Provide "Inspection and Testing Form" according to the "Inspection, Testing and Maintenance" chapter in NFPA 72, and include the following:

1) Equipment tested.
2) Frequency of testing of installed components.
3) Frequency of inspection of installed components.
4) Requirements and recommendations related to results of maintenance.
5) Manufacturer's user training manuals.

B. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.
2. Program Software Backup: On magnetic media or compact disk, complete with data files.
3. Device address list.
4. Printout of software application and graphic screens.

1.07 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

1.08 PROJECT CONDITIONS

A. Perform a full test of the existing system prior to starting work. Document any equipment or components not functioning as designed.

B. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary guard service according to requirements indicated:

1. Notify Owner no fewer than seven days in advance of proposed interruption of fire-alarm service.
2. Do not proceed with interruption of fire-alarm service without Construction Manager's written permission.

C. Use of Devices during Construction: Protect devices during construction unless devices are placed in service to protect the facility during construction.
1.09 SEQUENCING AND SCHEDULING

A. Existing Fire-Alarm Equipment: Maintain existing equipment fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service, and label existing fire-alarm equipment "NOT IN SERVICE" until removed from the building.

B. Equipment Removal: After acceptance of new fire-alarm system, remove existing disconnected fire-alarm equipment and wiring.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail in materials or workmanship within specified warranty period.

1. Warranty Extent: All equipment and components not covered in the Maintenance Service Agreement.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.01 SYSTEM DESCRIPTION

A. Source Limitations for Fire-Alarm System and Components: Components shall be compatible with, and operate as an extension of, existing system. Provide system manufacturer's certification that all components provided have been tested as, and will operate as, a system.

B. Noncoded, addressable system, with multiplexed signal transmission and audible/strobe evacuation.

C. Automatic sensitivity control of certain smoke detectors.

D. All components provided shall be listed for use with the existing system.

E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.02 SYSTEM SMOKE DETECTORS

A. Manufacturers: Subject to compliance with requirements, provide products listed for existing fire alarm system.

B. General Requirements for System Smoke Detectors:

1. Comply with UL 268; operating at 24-V dc, nominal.
2. Detectors shall be two-wire type.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.

5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.

6. Integral Visual-Indicating Light: LED type, indicating detector has operated.

7. Remote Control: Unless otherwise indicated, detectors shall be digital-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit.

   a. Rate-of-rise temperature characteristic of combination smoke- and heat-detection units shall be selectable at fire-alarm control unit for 15 or 20 deg F (8 or 11 deg C) per minute.
   b. Fixed-temperature sensing characteristic of combination smoke- and heat-detection units shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135 or 155 deg F (57 or 68 deg C).
   c. Multiple levels of detection sensitivity for each sensor.
   d. Sensitivity levels based on time of day.

C. Photoelectric Smoke Detectors:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.

2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:

   a. Primary status.
   b. Device type.
   c. Present average value.
   d. Present sensitivity selected.
   e. Sensor range (normal, dirty, etc.).

2.03 NOTIFICATION APPLIANCES

A. Manufacturers: Subject to compliance with requirements, provide products listed for existing fire alarm system and matching existing notification appliances.

B. General Requirements for Notification Appliances: Individually addressed, connected to a signaling-line circuit, equipped for mounting as indicated, and with screw terminals for system connections.

C. General Requirements for Notification Appliances: Connected to notification-appliance signal circuits, zoned as indicated, equipped for mounting as indicated, and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated, and with screw terminals for system connections.
D. Visible Notification Appliances: Xenon strobe lights complying with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.

   1. Rated Light Output:
      a. 15/30/75/110 cd, selectable in the field.

   2. Mounting: Wall mounted unless otherwise indicated.

   3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.

   4. Flashing shall be in a temporal pattern, synchronized with other units.

   5. Strobe Leads: Factory connected to screw terminals.


2.04 ADDRESSABLE INTERFACE DEVICE

A. General:

   1. Include address-setting means on the module.

   2. Store an internal identifying code for control panel use to identify the module type.

   3. Listed for controlling HVAC fan motor controllers.

B. Monitor Module: Microelectronic module providing a system address for alarm-initiating devices for wired applications with normally open contacts.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance of the Work.

   1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment and wiring are installed, before installation begins.

B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 EQUIPMENT INSTALLATION

A. Comply with NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."
1. Devices placed in service before all other trades have completed cleanup shall be replaced.
2. Devices installed but not yet placed in service shall be protected from construction dust, debris, dirt, moisture, and damage according to manufacturer's written storage instructions.

B. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.
   1. Connect new equipment to existing control panel in existing part of the building.
   2. Connect new equipment to existing monitoring equipment at the supervising station.
   3. Expand, modify, and supplement existing monitoring equipment as necessary to extend existing monitoring functions to the new points. New components shall be capable of merging with existing configuration without degrading the performance of either system.

C. Install a cover on each smoke detector that is not placed in service during construction. Cover shall remain in place except during system testing. Remove cover prior to system turnover.

3.03 PATHWAYS
   A. Pathways shall be installed in EMT.
   B. Junction box covers shall be painted red.

3.04 IDENTIFICATION
   A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
   B. Install framed instructions in a location visible from fire-alarm control unit.

3.05 FIELD QUALITY CONTROL
   A. Field tests shall be witnessed by authorities having jurisdiction.
   B. Perform the following 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 the "Completion Documents, Preparation" table in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
         b. Comply with the "Visual Inspection Frequencies" table in the "Inspection" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72;
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.

6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" section of the "Fundamentals" chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

C. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.

D. Fire-alarm system will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

F. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.

G. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.06 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION