Project Manual

City of Mattoon
Public Works Building
401 Dewitt Avenue East
Mattoon, Illinois 61938

TUG Project No. 2815018

July 8, 2016

EXP. 11/30/2016

Released for Bidding - Set Number _____

Architect / Engineer:
The Upchurch Group, Inc.
123 N. 15th St.
Mattoon, Illinois 61938
Phone: 217.235.3177
upchurchgroup@upchurchgroup.com

OWNER: Dean Barber, Director
Public Works Department
208 North 19th Street
Mattoon, IL 61938

ARCHITECT/ENGINEER: The Upchurch Group, Inc.
123 North 15th Street
Mattoon , IL 61938

PROJECT MANUAL FOR: Mattoon Public Works Building
401 Dewitt Avenue East
Mattoon, IL 61938

DATE: July 8, 2016

END TOC

The City of Mattoon, Illinois will receive bids for:

Project Name:	**Mattoon Public Works Building**
Project Location:	401 Dewitt Avenue East
User Agency:	City of Mattoon, Public Works
County:	Coles

The project consists of:

A. Site work to prepare a previously undeveloped site of approximately five acres for the construction of a new building and other site improvements.

B. Construction of a new pre-engineered metal building with an area of approximately 33,800 square feet. About 3,620 square feet of the building will be finished as office space, locker rooms, restrooms, and an employee break room. The balance of the space will be used for vehicle and equipment storage and maintenance. Complete mechanical and electrical systems are included in the work.

Bids will be received until: 11:00 A.M. CDT on Thursday, 28 July 2016

Submit Bids To: City Clerk
Mattoon City Hall
208 North 19th Street
Mattoon, Illinois 61938

Bid Opening: ***11:00 A.M. CDT on Thursday, 28 July 2016***
At the City Council Chambers (address above).
Bids will be publicly opened and read immediately after the specified closing time.

Obtain Plans: Plans may be obtained from the City Clerk's Office at City Hall, 208 N. 19th Street, Mattoon, IL 61938.

Information to Bidders:

A. Prevailing wages in accordance with Coles County is required.

B. ***Bid security and bonds are required.*** Bid security shall be in the form of a bid bond or certified check in an amount equal to ten percent (10%) of the base bid. Bid security shall be made payable to The City of Mattoon, Illinois. The successful Bidder shall furnish a Performance Bond and Labor & Material Payment Bond, each in an amount equal to 100% of the contract amount.

C. The specified construction period is 180 consecutive calendar days from the date which appears on the Notice of Award.

The City of Mattoon, Illinois

Susan O'Brien, City Clerk
City of Mattoon, Illinois

END 00030

1. GENERAL

1.01 DEFINITIONS

A. All definitions set forth in the General Conditions of the Contract for Construction, AIA Document A-201, are applicable to these Instructions to Bidders.
B. Bidding documents include the Advertisement for Bid, Instructions to Bidders, the bid forms and the proposed Contract Documents including any Addenda issued prior to receipt of Bids.
C. Addenda are written or graphic instruments issued prior to the execution of the Contract which modify or interpret the bidding documents, including Drawings and Specifications, by additions, deletions, clarifications or corrections. Addenda will become part of the Contract Documents when the Construction Contract is executed.
D. The Upchurch Group, Inc. will be hereafter referred to in this Specification as "Architect", "Architect/Engineer" or "A/E" and all correspondence shall be addressed to: 123 N. 15th St. Mattoon, Illinois 61938.
E. A Bid is a complete and properly signed proposal to do the Work for designated portion thereof for the sums stipulated therein, submitted in accordance with the Bidding Documents.
F. The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which work may be added or from which work may be deleted for sums stated in Alternate Bids.
G. An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents or in the proposed Contract Documents.
H. A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials or service as described in the Bidding Documents or in the proposed Contract Documents.
I. A Bidder is a person or entity who submits a Bid to the Owner.
J. A Sub-Bidder is a person or entity who submits a bid to a Bidder for materials or labor for a portion of the Work.

1.02 EXAMINATION OF DOCUMENTS AND SITE

A. Each Bidder, by making his Bid, represents that he has read and understands the Bidding Documents.
B. Each Bidder, by making his Bid, represents that he has visited the site and familiarized himself with the local conditions under which the Work is to be performed.
C. Each Bidder by making his Bid represents that his Bid is based upon the materials, systems and equipment required by the Bidding Documents without exception.

1.03 BIDDING PROCEDURES

A. All Bids shall be prepared on the forms provided by the Architect and submitted in accordance with the Instructions to Bidders.
B. A Bid is invalid if it has not been deposited at the designated location prior to the time and date for receipt of bids indicated in the Advertisement or Invitation to Bid, or prior to any extension thereof issued to the Bidders.
C. Unless otherwise provided in any supplement to these Instructions to Bidders, no bidder shall modify, withdraw or cancel his Bid or any part thereof for thirty days after the time designated for the receipt of Bids in the Advertisement or Invitation to Bid.
D. Prior to the receipt of Bids, Addenda will be mailed or delivered to each person or firm recorded by the Architect as having received the Bidding Documents and will be available for inspection wherever the Bidding Documents are kept available for that purpose.
E. Bids shall not contain any recapitulation of the Work to be done and no oral or telephone proposals or modifications will be considered.
F. The Bidder shall make no additional stipulations on the Bid Form nor limit or qualify his Bid in any other manner. Bids so qualified will be subject to disqualification.
G. Only written instructions will be binding. The Architect will not be responsible for any oral,

telegraphic or telephonic instructions.

H. The names of all Subcontractors and material suppliers proposed to be employed shall be submitted for approval by the Architect before they are employed, and all such Subcontractors and material suppliers must be known to perform work of a high standard in their respective trades. If the A/E has reasonable objection to any such proposed person or entity, and notifies the Bidder in writing of such objection, the Bidder shall provide an acceptable substitute person or entity in accordance with Article 5.2 of the General Conditions.

1.04 DISCREPANCIES AND AMBIGUITIES. Each Bidder shall examine the Bidding Documents carefully and, not later than seven days prior to the date for receipt of Bids, shall make written request to the Architect for interpretations or correction of any ambiguity, inconsistency or error therein which he may discover. Any interpretation or correction will be issued as an Addendum by the Architect. Only a written interpretation or correction by Addendum shall be binding. No Bidder shall rely upon any interpretation or correction given by any other method.

1.05 SUBSTITUTIONS

A. Each Bidder represents that his Bid is based upon the materials and equipment described in the Bidding Documents.

B. No substitution will be considered unless written request has been submitted to the Architect for approval at least 7 days prior to the date for receipt of Bids.

C. If the Architect approves a proposed substitution, such approval will be set forth in an Addendum or letter of approval.

1.06 QUALIFICATION OF BIDDERS

A. If required, a Bidder shall submit to the Architect a properly executed Contractor's Qualification Statement, AIA Document A-305 and/or properly documented experience record.

B. Bidders may be disqualified and their Bids not considered for any of the following specific reasons:
   1. Reason to believe collusion exists among Bidders.
   2. The Bidder being interested in any litigation against the Owner.
   3. The Bidder being in arrears on any existing contract or having defaulted on a previous contract.
   4. Lack of competency as revealed by the financial statement, experience and equipment, questionnaires, or qualification statement.
   5. Uncompleted work which in the judgment of the Owner will prevent or hinder the prompt completion of additional work if awarded.

C. If required, a Bidder shall submit to the Architect a confidential Financial Statement in a sealed envelope.

1.07 BASIS OF BID. The Bidder shall include all unit cost items and all alternates shown on the Bid Form; failure to comply may be cause for rejection. No segregated Bids or assignments will be considered.

1.08 PREPARATION OF BID. Bidder shall submit his Bid on the forms furnished by the Architect. All blank spaces in forms shall be correctly filled in and the Bidder shall state the prices, written in words and in figures. Where there is discrepancy between the price written in words and the price written in figures, the price written in words shall govern. If Bid is submitted by an individual, his name must be signed by him or his duly authorized agent. If the Bid is submitted by a firm, association or partnership, the name and address of each member must be given, and the Bid must be signed by an official or duly authorized agent. Powers of attorney authorizing agents or others to sign Bids must be properly certified and must be in writing and submitted with the Bid.

1.09 BID GUARANTY

A. A Bid Security is required for this project.
B. No Bid shall be considered unless it is accompanied by a cashier's check on any State or National Bank in Illinois or acceptable Bid Bond, payable unconditionally to the Owner. The cashier's check or Bid Bond shall be in the amount of not less than ten percent (10%) of the total amount of the Bid. The Bid guaranty is required by the Owner as evidence of good faith and as a guarantee that, if awarded the contract, the Bidder will execute the contract and furnish the required bonds within fifteen (15) days after the Bid is accepted. Said bonds shall further guarantee that if the Bid is withdrawn after the Bids have been opened or if the Contractor refuses to execute the contract in accordance with his Bid, the Contractor and the Surety shall become liable to the Owner for damages incurred. If a Bidder's bond is used, the Surety thereon shall designate an agent resident in the local county, to whom requisite notices may be delivered and upon whom service of process may be had. If a Bidder's bond is not used, an acceptable Surety shall be determined from the latest United States Treasury Department list of companies holding certificates of authority as acceptable Sureties on Federal Bonds.
C. As soon as possible after prices have been tabulated for comparison of Bids, the Owner may, at its discretion, return the Bid guaranties accompanying the Bids, which in its judgement, would not be considered in the award; all other Bid guaranties will be retained by the Owner until the required contract and bonds have been executed, after which they will be returned. No Bid guaranties will be returned until at least two days have elapsed from time of opening Bids.

1.10 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND. The Owner will require proper Performance and Labor and Material Payment Bonds, each in an amount equal to 100% of the contract price.

1.11 FILING BID. No Bid will be considered unless it is filed within the time limit for receiving Bids as stated in the Advertisement. Each Bid shall be in a sealed envelope plainly marked with the word "BID", and the name and description of the project as designated in the Advertisement.

1.12 MODIFICATION AND WITHDRAWAL OF BID. Bid may not be modified after submittal. Bidders may withdraw at any time before opening, but may not resubmit them. No Bid may be withdrawn or modified after the Bid opening except where the award of the Contract has been delayed beyond 30 days after date of Bid.

1.13 OPENING BID. The Bids submitted will be opened at the time stated in the Advertisement and publicly read aloud, and shall thereafter remain on file with the Owner.

1.14 IRREGULAR BID. Bids will not be considered if they show any omissions, alterations of form, additions, or conditions not requested, unauthorized alternate Bids or irregularities of any kind. However, the Owner reserves the right to waive any irregularities and to make the award in the best interest of the Owner.

1.15 REJECTION OF BID. The Bidder acknowledges the right of the Owner to reject any or all Bids and to waive any informality or irregularity in any Bid received. In addition, the Bidder recognizes the right of the Owner to reject a Bid if the Bidder failed to furnish any required Bid security, or to submit the data required by the Bidding Documents, or if the Bid is any way incomplete or irregular.

1.16 SUBMISSION OF POST-BID INFORMATION. Upon request by the Architect, the selected Bidder shall, within seven days thereafter submit the following:

A. A statement of cost for each major item of Work included in the Bid.
B. A designation of the Work to be performed by the Bidder with his own forces.
C. A list of names of the Subcontractors or other persons or organizations (including those who are to furnish materials or equipment fabricated to a special design) proposed for such portions of the Work as may be designated, the names of documents or, if no portions are so designated, the names of the Subcontractors proposed for the principal portions of the Work. The Bidder will be required to establish to the satisfaction of the Architect and the Owner the reliability and

responsibility of the proposed Subcontractors. Prior to the award of the Contract, the Architect will notify the Bidder in writing if either the Owner or the Architect, after due investigation, has reasonable and substantial objection to any person or organization on such lists. If the Owner or Architect has a reasonable and substantial objection to any person or organization on such list, and refuses in writing to accept such person or organization, the Bidder may, at his option, withdraw his Bid without forfeiture of Bid Security. If the Bidder submits an acceptable substitute with an increase in his Bid price to cover the difference in cost occasioned by such substitution, the Owner may at his discretion, accept the increased Bid price or he may disqualify the Bidder. Subcontractors and other persons and organizations proposed by the Bidder and accepted by the Owner and Architect must be used on the Work for which they were proposed and accepted, and shall not be changed except with the written approval of the Owner and the Architect.

1.17 AWARD OF CONTRACT. After Bids are opened, the Bids will be tabulated for comparison on the basis of the Bid prices and quantities shown in the Bids. The Owner reserves the right to withhold the award of the Contract for a period of 30 days from the date of opening Bids and no award will be made until the Owner is satisfied as to the responsibilities of the low Bidders. Until final award of the Contract, the Owner reserves the right to reject any or all Bids or proceed to do the work otherwise in the best interest of the Owner.

1.18 EXECUTION OF CONTRACT. The person or persons, partnership, company, firm, association or corporation to whom a contract is awarded shall within ten (10) days after such award, sign the necessary agreements entering into the required Contract with the Owner. No contract shall be binding on the Owner until it has been executed by the Owner or his duly authorized representative, and delivered to the Contractor.

1.19 FAILURE TO EXECUTE CONTRACT. The failure of the Bidder to execute the required bonds or to sign the required Contract within ten (10) days after the Contract is awarded, shall be considered by the Owner as abandonment of his Bid, and the Owner may annul the award. By reason of the uncertainty of the market prices of materials and labor, and the impracticality and difficulty of determining accurately the amount of damages accruing to the Owner by reason of said Bidder's failure to execute said Bonds and Contract within ten (10) days, the Bid Guaranty accompanying the Bid shall be the agreed amount of damages which the Owner will suffer by reason of such failure to execute the Contract. The filing of a Bid will be considered as an acceptance of this provision.

1.20 EXEMPTION FROM SALES TAX ON MATERIALS. The Owner is exempted by Section Three of the Illinois Use Tax Act (Sec 3, House Bill 1610, approved July 31, 1961. IL. Rev. Stat. 1961, Chap. 120 Sec 439.3) from paying any of the taxes imposed by that act and sales to the Owner are exempt by Section Two of the Illinois Retailer's Occupational Tax Act (Section 2, House Bill 1609, Approved July 31, 1961 IL. Rev. Stat. 1961, Chap. 120 Sec. 441) from any of the taxes imposed by that Act.

1.21 WAGE SCALE. Not less than the general prevailing rates of per diem wages for work of similar character in the locality where the work is performed shall be paid all laborers, workman, and mechanics employed in the construction of public works. The Contractor and each Subcontractor shall keep or cause to be kept, an accurate record showing the names of occupations of all laborers, workmen and mechanics employed by him, in connection with said public work, and showing also the actual per diem wages paid to each of the workers. These records shall be open at all reasonable hours to the inspection of the Illinois Department of Labor or its authorized agents.

1.22 EQUAL OPPORTUNITY EMPLOYMENT

A. The Contractor shall not discriminate against any employee or applicant for employment because of race, creed, color or national origin. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to race, creed, color or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and

applicants for employment, notices to be provided by the contracting officer setting forth the provisions of the nondiscrimination clause.

B. The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, color or national origin.

C. The Contractor shall send to each labor union or representative of workers with which he had a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer, advising the labor union or worker's representative of the contractor's commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

D. In the event of the Contractor's noncompliance with the nondiscrimination clauses of this Contract or with any of such rules, regulations, or orders, this Contract may be canceled, terminated or suspended in whole or in part and the Contractor may be declared ineligible for further Government Contracts in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked and provided in Executive Order No. 11246 of September 24, 1965965, or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law.

E. The Contractor shall include the provisions of Paragraph (A) through (D) in every Subcontractor purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each Subcontractor or Vendor. The Contractor will take such action with respect to any subcontract or purchase order as the contracting agent may direct as a means of enforcing such provisions, including sanctions for noncompliance: Provided, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a Subcontractor or Vendor as a result of such direction by the contracting agency, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

END 00100

DATE: _____

BID TO: City of Mattoon, Public Works

BID FROM: _____
(Bidder's Name)

_____
(Bidder's Address)

THE UNDERSIGNED:

1. Acknowledges receipt of:

   a. Project Manual for City of Mattoon Public Works Building dated July 8, 2016.

   b. Drawings; dated July 8, 2016.

   c. Addenda: No.____, dated: _____. No.____, dated:_____ _____.

      No.____, dated: _____. No.____, dated: _____.

      No.____, dated: _____. No.____, dated: _____.

2. Has examined the site and all bidding documents. The successful Bidder shall be responsible for performing all work specifically required of him by all parts of the bidding documents, including all drawings and specifications for the entire project even though such work may be included as related requirements specified in other divisions or sections.

3. Agrees:

   a. To hold this bid open until 30 calendar days after bid opening date.

   b. To enter into and execute a contract with the Owner if awarded on the basis of this bid, and in connection therewith to:
      (1) Furnish insurance and bonds required by the bidding documents.
      (2) Accomplish the work in accordance with the Contract.
      (3) Complete the work within the contract time herein specified.

4. CONTRACT TIME. The construction period is 180 consecutive calendar days commencing on the date which appears on the Notice of Award.

BASE BID. Bidder agrees to perform all work, exclusive of alternate bids, as set forth in the bidding documents, for the sum of:

_____ DOLLARS ($_____)

ALTERNATE BID WORK - None

PROPOSED PRODUCT SUBSTITUTION LIST

The base bid and alternate bids are understood to include only those products which are specified in the bidding documents. Following is a list of substitute products which bidder proposes to furnish on this project, with the difference in price being added to or deducted from the base bid or alternate bids.

Bidder understands that acceptance of any proposed substitution is at Owner's option. Approval or rejection of any substitutions listed below will be indicated prior to executing the Contract.

MANUFACTURER'S NAME AND PRODUCT	ADD AMOUNT	DEDUCT AMOUNT

Bidder's proposal shall be in accordance with the provisions of Division 1, Section 01630, "Substitutions & Product Options".

EVALUATION Contract award will be made in accordance with Instructions To Bidders. Only the successful bidder's proposed product substitution list will be evaluated.

BIDDER'S NAME: _____

REPRESENTATIONS & CERTIFICATIONS. The bidder by the execution of this Bid Form makes the following representations and certifications as a part of his bid on the project identified in the Bid Form. In the case of a joint venture bid, each party represents and certifies as to his own organization.

1. AVAILABILITY. The number and amount of other contracts and awards pending which I am or will become obligated to perform, now and during the course of my work on this project, will not interfere with or hinder the timely prosecution of my work.

2. INDEPENDENT PRICE DETERMINATION. The contract sum in this bid has been arrived at independently, without consultation, communication or agreement for the purpose of restricting competition.

3. OPEN COMPETITION. I have not offered any money or other valuable thing to any person to induce him not to bid on this project or as recompense for his not having bid on this project, and therefor have not violated the prevention of competition provisions contained in the Illinois Purchasing Act in preparing my bid.

4. PREVAILING WAGE. I will pay, and require each subcontractor to pay, not less than the general prevailing rate of hourly wages for work of a similar character in the locality in which the work is performed, and not less than general prevailing rate of hourly wages for legal holidays and overtime work, as determined by the Illinois Department of Labor, pursuant to the Illinois Revised Statutes, ch. 48, par. 39s-1 et. seq.

RESPECTFULLY SUBMITTED, signed and sealed this _____ day of _____, 2016.

_____
Contractor Firm Name

ATTEST:

_____ BY _____
Name Signature

_____ _____
Corporate Secretary (Corporations Only) Title

_____
Official Address

_____
Telephone Number

SIGNATURE IS REQUIRED ON THIS PAGE.

Know all men by these presents, that we *(Insert Full Name and Address or legal title of Contractor here.)*

as Principal, herinafter called the Principal, and *(Insert the Full Name and Address or legal title of Surety here)*

a corporation of the State of _____ as Surety, herinafter called the Surety, are held and firmly bound unto **The City of Mattoon, Illinois** as Obligee, hereinafter called the Obligee, in the sum of _____ Dollars ($), for the payment of which sum Principal and Surety bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Whereas, the Principal has submitted a bid to Obligee to perform certain Work for the project commonly known as **"Mattoon Public Works Building"** in accordance with bidding documents for the project.

Now, therefore, if:

1. The Obligee accepts the bid of the Principal and the Principal enters into a Contract with the Obligee in accordance with the terms of such bid, and the Principal complies with all post award requirements set forth in the terms of the bid, including the provision of any performance and/or payment bonds that may be specified, or if
2. The Obligee accepts the bid of the Principal who subsequently fails to enter into a Contract with the Obligee in accordance with the terms of such bid, or fails to comply with all of the post award requirements set forth in the terms of the bid, and the Principal pays to the Obligee the difference between the amount specified in the Principal's bid and such larger amount for which the Obligee may in good faith contract with another to perform the Work covered by the bid,

then this obligation shall be null and void, otherwise to remain in full force and effect.

Surety hereby agrees that its obligation shall not be impaired by any extensions of time for Obligee's acceptance or compliance with post award requirements. Surety hereby waives notice of such extensions.

Signed and sealed this _____ day of _____, 2016.

_____	_____
Surety	Contractor
By: _____ (Seal)	***By:*** _____ (Seal)
	Attorney-in-Fact
TITLE _____	
ATTEST:	
SECRETARY	
_____	_____
	Resident Agent

END 00410

AIA Document A101

Standard Form of Agreement Between Owner and Contractor

where the basis of payment is a
STIPULATED SUM

THIS DOCUMENT HAS IMPORTANT LEGAL CONSEQUENCES; CONSULTATION WITH AN ATTORNEY IS ENCOURAGED WI TH RESPECT TO ITS COMPLETION OR MODIFICATION.
The 1987 Edition of AIA Document A201, 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.
This document has been approved and endorsed by The Associated General Contractors of America.

AGREEMENT

made as of the XXth day of Xxxxxxx in the year of Two Thousand and Sixteen

BETWEEN the Owner: ***City of Mattoon, IL***
208 North 19th Street
Mattoon, IL 61938

and the Contractor: ***Contractor's Name***
Contractor's mailing address
City, State and Zip Code

The Scope of Work is: ***All Work***

The Project is: ***Mattoon Public Works Building***
(Name and location) *401 Dewitt Avenue East*
Mattoon, IL 61938

The Architect is: ***The Upchurch Group, Inc.***
(Name and address) *123 N. 15th St.*
Mattoon, Illinois 61938

The Owner and Contractor agree as set forth below.

Copyright 1915, 1918, 1925, 1937, 1951, 1958, 1961, 1963, 1967, 1974, 1977, © 1987 by the American Institute of Architects, 1735 New York Avenue, N.W., Washington, D.C. 20006. Reproduction of the material herein or substantial quotation of its provisions without written permission of the AIA violates the copyright laws of the United States and will be subject to legal prosecution.

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; these 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 Modifications, appears in Article 9.

ARTICLE 2
THE WORK OF THIS CONTRACT

The Contractor shall execute the entire Work described in the Contract Documents, except to the extent specifically indicated in the Contract Documents to be the responsibility of others, or as follows:

ARTICLE 3
DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

3.1 The date of commencement is the date from which the Contract Time of Paragraph 3.2 is measured, and shall be the date of this Agreement, as first written above, 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. ***The commencement time is the date that appears on the Notice to Proceed.***

Unless the date of commencement is established by a notice to proceed issued by the Owner, the Contractor shall notify the Owner in writing not less than five days before commencing the Work to permit the timely filing of mortgages, mechanic's liens and other security interests.

3.2 The embankment under the proposed building and the construction of the detention basin shall be completed by October 31, 2016. The remaining work shall be completed within one year of the date on the Notice to Proceed. The project is being paid from existing City funds. There is no outside funding for this contract.

ARTICLE 4
CONTRACT SUM

4.1 The Owner shall pay the Contractor in current funds for the Contractor's performance of the Contract the Contract Sum of ***Xxxxxxxxxxxxxxxxxxxxxxxxxxxx Dollars & Xxxx Cents ($ XXXXXXXXX)*** 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:

ARTICLE 5
PROGRESS PAYMENTS

5.1 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.

5.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

The period covered by each application for payment shall be one (1) calendar month ending on the fifteenth (15th) day of the month.

5.3 Provided an Application for Payment is received by the Architect not later than the ***Twentieth (20th)*** day of a month, the Owner shall make payment to the Contractor not later than the ***Twentieth (20th)*** day of the ***next*** month. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than ***Sixty (60)*** days after the Architect receives the Application for Payment.

5.4 Each Application for Payment shall be based upon the 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 and be prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This Schedule. unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

5.5 Applications for Payment shall indicate the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

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

5.6.1 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 total Contract Sum allocated to that portion of the Work in the Schedule of Values, less retainage of ***Ten*** percent (***10%***) . Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute may be included as provided in Subparagraph 7.3.7 of the General Conditions even though the Contract Sum has not yet been adjusted by Change Order;

5.6.2 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, suitably stored off the site at a location agreed upon in writing), less retainage of ***Ten*** percent (***10%***);

5.6.3 Subtract the aggregate of previous payments made by the Owner; and

5.6.4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Paragraph 9.5 of the General Conditions.

5.7 The progress payment amount determined in accordance with Paragraph 5.6 shall be further modified under the following circumstances:

5.7.1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to ***Ninety Five*** percent (***95%***) of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work and unsettled claims; and

5.7.2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Subparagraph 9.10.3 of the General Conditions.

5.8 Reduction or limitation of retain age, if any, shall be as follows: **N/A**

ARTICLE 6
FINAL PAYMENT

Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when (l) the Contract has been fully performed by the Contractor except for the Contractor's responsibility to correct nonconforming Work as provided in Subparagraph l 2.2.2 of the General Conditions and to satisfy other requirements, if any, which necessarily survive final payment; and (2) a final Certificate for Payment has been issued by the Architect; such final payment shall be made by the Owner not more than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

ARTICLE 7
MISCELLANEOUS PROVISIONS

7.1 Where reference is made in this Agreement to a provision of the General Conditions or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

7.2 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.)
One and one-half percent (1½%) per month (18% A.P.R.)

7.3 Other provisions: ***None***

ARTICLE 8
TERMINATION OR SUSPENSION

8.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of the General Conditions.

8.2 The Work may be suspended by the Owner as provided in Article 14 of the General Conditions.

ARTICLE 9
ENUMERATION OF CONTRACT DOCUMENTS

9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated as follows:

9.1 .1 The Agreement is this executed Standard Form of Agreement Between Owner and Contractor,

9.1.2 The General Conditions are the General Conditions of the Contract for Construction, AIA Document A201, 1987 Edition.

9.1.3 The Supplementary and other Conditions of the Contract are those contained in the Project Manual dated ***July 8, 2016***, and are as follows:

See Table of Contents

9.1.4 The Specifications are those contained in the Project Manual dated as in Subparagraph 9.1.3, and are as follows:

See Table of Contents

9.1.5 The Drawing are dated ***July 8, 2016*** unless a different date is shown below:
(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

9.1.6 The Addenda, if any, are as follows:

Number	Date	Pages

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 Other documents, if any, forming part of the Contract Documents are as follows: ***None***

This Agreement is entered into as of the day and year first written above and is executed in at least three original copies of which one is to be delivered to the Contractor, one to the Architect for use in the administration of the Contract, and the remainder to the Owner.

OWNER: ***City of Mattoon, IL***

Contractor's Name:

(Signature)	*(Signature)*
(Printed name and title)	*(Printed name and title)*

Performance Bond

KNOW ALL MEN BY THESE PRESENTS: that

(Here insert full name and address or legal title of Contractor)

as Principal, hereinafter called Contractor, and,

(Here insert full name and address or legal title of Surety)

as Surety, hereinafter called Surety, are held and firmly bound unto **the City of Mattoon, IL**

as Obligee, hereinafter called Owner, in the amount of

Dollars ($),

for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Contractor has by written agreement dated 2016, entered into a contract with Owner for **construction of the new Mattoon Public Works Building**

in accordance with Drawings and Specifications prepared by **The Upchurch Group, Inc.**

which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

PERFORMANCE BOND

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly and faithfully perform said Contract, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

The Surety hereby waives notice of any alteration or extension of time made by the Owner.

Whenever Contractor shall be, and declared by Owner to be in default under the Contract, the Owner having performed Owner's obligations thereunder, the Surety may promptly remedy the default, or shall promptly

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

2) Obtain a bid or bids for completing the Contract in accordance with Its terms and conditions, and upon de termination by Surety of the lowest responsible bidder, or, if the Owner elects, upon determination by the Owner and the Surety jointly of the lowest responsible bidder, arrange for a contract between such bidder and Owner, and make available as Work progresses (e~en though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price, as used in this paragraph, shall mean the total amount payable by Owner to Contractor under the Contract and any amendments thereto, less the amount properly paid by Owner to Contractor.

Any suit under this bond must be instituted before the expiration of two (2) years from the date on which final payment under the Contract falls due.

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

Signed and sealed this day of 2016.

_____
(*Principal*) (*Seal*)

_____ {
(Witness)

_____
(*Title*)

_____
(*Principal*) (*Seal*)

_____ {
(Witness)

_____
(*Title*)

Labor and Material Payment Bond

THIS BOND IS ISSUED SIMULTANEOUSLY WITH PERFORMANCE BOND IN FAVOR OF THE OWNER CONDITIONED ON THE FULL AND FAITHFUL PERFORMANCE OF THE CONTRACT

KNOW ALL MEN BY THESE PRESENTS: that

(Here insert lull name and address or legal title of Contractor)

as Principal, hereinafter called Principal, and,

(Here insert lull name and address or legal title of Surety)

as Surety, hereinafter called Surety, are held and firmly bound unto **the City of Mattoon, IL**

as Obligee, hereinafter called Owner, for the use and benefit of claimants as herein below defined, in the

amount of
(Here insert a sum equal to at least the contract price) Dollars ($),

for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS,

Principal has by written agreement dated 2016 entered into a contract with Owner for

construction of the new Mattoon Public Works Building

in accordance with Drawings and Specifications prepared by **The Upchurch Group, Inc.**

which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

Now, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly make payment to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the. Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions:

1. A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light. heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

2. The above named Principal and Surety hereby jointly and severally agree with the Owner that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant. prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The Owner shall not be liable for the payment of any costs or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant:

a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: the Principal, the Owner, or the Surety above named, within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail; postage prepaid, in an envelope ad dressed to the Principal, Owner or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the state in which the aforesaid project is located, save that such service need not be made by a public officer.

b) After the expiration of one (1) year following the date on which Principal ceased Work on said Contract, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the state in which the Project, or any part thereof, is situated, or in the United States District Court for the district in which the Project, or any part thereof, is situated, and not elsewhere.

4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

Signed and sealed this day of 2015.

_____ (*Principal*) (*Seal*)

_____ {

(Witness)

_____

(*Title*)

_____ (*Principal*) (*Seal*)

_____ {

(Witness)

_____

(*Title*)

The General Conditions are "General Conditions of the Contract for Construction"; AIA Document A 201 (1987 Edition).

By this reference this document is an integral part of these Contract Documents.

This document is available for review from the Architect.

END 00700

Following is a list of modifications to the General Conditions and other Supplementary Conditions.

1. **Drawing Index**. The drawings portion of the Construction Documents consists of the drawing sheets which are listed on the cover sheet of the drawings (Sheet G1).

2. **Insurance Requirements**.

a. Commercial General Liability:

Each Occurrance	$1,000,000
Personal & Advertising Injury	$1,000,000
General Aggregate	$2,000,000
Products & Completed Operations Aggregate	$1,000,000

Automotive Liability - Owned, Non-Owned, and Hired Autos:

Combined Single Limit	$1,000,000
Or	
Bodily Injury per Person	$1,000,000
Bodily Injury per Accident	$1,000,000
Property Damage per Accident	$1,000,000

Workers Compensation: Statutory Limits

Employers Liability:

Each Accident	$ 500,000
Disease - Each Employee	$ 500,000
Disease - Policy Limit	$ 500,000

3. **Insurance, General**

a. Sole Discretion. The Owner shall exercise sole discretion to determine acceptability of insurance.

b. Acceptability of Insurance Companies. In addition to other requirements stated herein, insurance is acceptable when issued by an insurance company that meets all of the following standards:

1) Has a current Best's rating of any level of “B” or better; and has a current Best's financial class of “V” or higher.
2) Is duly licensed in the state of Illinois by the Illinois Department of Insurance, and does not have an unacceptable record of improper conduct or financial problems with the Illinois Department of Insurance.
3) Does not have a history of unacceptable performance related to Owner claims.
4) Is covered by the Insurance Guaranty Fund.
5) Neither the firm nor any of its officers or owners shall have been convicted of a felony unless more than one year has passed since the completion of the felony sentence. The firm is not disqualified from bidding on public works projects by reason of any consent decree or order imposing sanctions upon the company arising out of a civil or criminal action brought against the firm or any of its officers or owners.

c. Cut-through Endorsements. Policies with a 100% cut-through endorsement giving all claimants a direct right of recovery against a reinsurer when the primary insurer fails or is unable to pay for any reason, shall be acceptable provided that a proper endorsement and reinsurance treaty is submitted.

d. Discretion to Adjust Criteria.

1) The requirements outlined herein shall constitute minimum requirements unless waived prior to bidding by Owner in extraordinary cases that include, but are not limited to the following:
   a) Insurance that meets the requirements is not available due to market changes or the nature of the project.
   b) Characteristics of the construction project justify less stringent requirements.

c) Available insurance, although not in technical compliance with the requirements, is determined to be as reliable as insurance in technical compliance.

d) Insurance policies not covered by the Illinois Insurance Guaranty Fund (215 ILCS 5/532 et seq.) shall not be acceptable unless Owner agrees that the Contractor has satisfactorily demonstrated extraordinary circumstances justifying an exception. Examples of such policies are: Risk Retention Groups and the Illinois Insurance Exchange. The following shall not constitute extraordinary circumstances justifying an exception:

- The Contractor already has a policy in effect that does not meet the requirements.
- The Contractor's insurance agent does not represent companies that offer insurance meeting the requirements.
- Insurance meeting the requirements is more expensive than insurance which does not.
- The Contractor's work performance or financial condition precludes it from obtaining insurance which meets the requirements.

d. Owner may set more stringent criteria for insurance when determined to be justified by the nature of the construction project.

e Unacceptable Performance of an Insurance Company. Unacceptable performance of an insurance company related to Owner claims may consist of one or more of the following:

1) Failure to respond to Owner communications within a reasonable time.
2) Failure to acknowledge receipt of a claim within thirty calendar days.
3) Failure to investigate and respond to a claim within sixty calendar days;
4) Failure to pay meritorious claims on a timely basis.
5) Failure to work cooperatively and in good faith with Owner.
6) Failure to provide Owner with requested documentation within a reasonable time, including but not limited to, insurance policies, inspection reports, certificates, binders, and general correspondence.

f. Evidence of Insurance.

1) Contractor shall file with Owner evidence of complete coverage of all insurance required by this article, bearing the original signature of the insurance company's authorized agent. Acceptable evidence of insurance is:
   a) A binder or certificate of insurance accompanied by endorsements as set out below:
   b) The complete insurance policy, including all required endorsements.
2) Endorsements shall be required on each certificate or policy which include each of the following statements:
   a) “The coverage and limits conform to the minimums required by Article 3 of Section 00800 of the Project Manual.” Any exception or deviation shall be brought to the attention of Owner for a ruling on acceptability.
   b) Architect/Engineer’s project number and name of the project covered by the policy.
   c) The company agrees to timely provide complete copies of policies upon request by Owner.
   d) The policy will not be canceled, changed or altered until at least ten calendar days prior written notice has been given to the Contractor and Owner, unless the same is stated in a policy provision.
   e) Owner and Architect/Engineer are included as additional named insureds for occurrences arising in whole or in part out of the work and operations performed. This endorsement does not apply to Workmen's Compensation Insurance policies.

3. The contract shall not be executed until acceptable evidence of coverage is on file with Owner. The Contractor shall at its own expense and delay, cease operations if the insurance required is terminated or reduced below the required amounts of coverage.

Owner may stop payment to the Contractor if the insurance required is terminated or reduced below the required amounts of coverage. In no event shall any failure of Owner to receive

policies or certificates or to demand receipt be construed as a waiver of the Contractor's obligation to obtain and keep in force the required insurance and to provide the required evidence of insurance.

g. Reconstruction. The prompt repair or reconstruction of the work as a result of an insured loss or damage shall be the Contractor's responsibility and shall be accomplished at no additional cost to Owner or Architect/Engineer. The Contractor shall furnish proper assistance in the adjustment and settlement of all losses. Loss will be adjustable with and payable to the party purchasing the builder's risk insurance, who shall be responsible for apportioning the loss proceeds to each and every entity involved in the loss to the extent of its interest.

h. Insurance shall remain in effect until final acceptance and at all times thereafter when the Contractor may be correcting, removing or replacing defective work or as otherwise adjusted by the Owner depending upon the circumstances of such correction, removal or replacement.

f. Additional Insured. Owner and Architect/Engineer shall, by endorsement, be included as additional named insureds.

g. Owner Rights. Owner reserves the right to take over the policy or extend coverage after default, cancellation or termination of coverage for any reason.

h. Beneficial Occupancy. The policy by its terms or endorsement shall specifically permit and allow for beneficial or partial occupancy prior to substantial completion of the project by Architect/Engineer.

i. Waiver of Damages. Owner, the Architect/Engineer and Contractor waive all rights each against the others for damages caused by fire or any other peril to the extent any loss or claim is covered by Builder's Risk Insurance or any other valid insurance applicable to the project except such rights as they may have to the proceeds of such insurance held by any of the insured as a result of loss. Contractor shall require similar waivers of subrogation from all subcontractors.

4. **Permit Fees**

a. The City of Mattoon will waive all building permit fees, water tap fees, and sewer tap fees.

b. The City of Mattoon will pay the cost of any installation fees charged by Ameren Gas, Ameren Electric, or Consolidated Communications.

5. **Tax Exemption** - The materials incorporated into this project are exempt from Illinois State Sales Tax.

6. Prevailing Wage Information - See pages immediately following.

Coles County Prevailing Wage for July 2015

(See explanation of column headings at bottom of wages)

Trade Name	RG	TYP	C	Base	FRMAN	M-F>8	OSA	OSH	H/W	Pensn	Vac	Trng
ASBESTOS ABT-GEN		BLD		30.490	31.740	1.5	1.5	2.0	6.300	12.98	0.000	0.900
ASBESTOS ABT-MEC		BLD		22.000	23.000	1.5	1.5	2.0	6.700	6.350	0.000	0.650
BOILERMAKER		BLD		33.340	35.840	1.5	1.5	2.0	7.070	21.53	1.250	0.400
BRICK MASON		BLD		31.320	32.820	1.5	1.5	2.0	7.200	11.57	0.000	0.850
CARPENTER		BLD		31.700	33.950	1.5	1.5	2.0	8.000	14.15	0.000	0.520
CARPENTER		HWY		32.100	33.850	1.5	1.5	2.0	8.000	14.15	0.000	0.520
CEMENT MASON		BLD		31.010	32.760	1.5	1.5	2.0	7.200	9.050	0.000	0.500
CEMENT MASON		HWY		31.630	33.130	1.5	1.5	2.0	7.200	9.050	0.000	0.500
CERAMIC TILE FNSHER		BLD		29.580	0.000	1.5	1.5	2.0	7.200	8.200	0.000	0.000
ELECTRIC PWR EQMT OP		ALL	1	36.770	0.000	1.5	1.5	2.0	5.760	10.29	0.000	0.370
ELECTRIC PWR EQMT OP		ALL	2	33.940	0.000	1.5	1.5	2.0	5.760	9.510	0.000	0.340
ELECTRIC PWR GRNDMAN		ALL		27.970	0.000	1.5	1.5	2.0	5.760	7.830	0.000	0.280
ELECTRIC PWR LINEMAN		ALL		47.620	50.830	1.5	1.5	2.0	5.760	13.33	0.000	0.480
ELECTRICIAN		BLD		35.910	39.500	1.5	1.5	2.0	6.600	8.370	0.000	0.540
ELECTRONIC SYS TECH		BLD		31.130	32.880	1.5	1.5	2.0	5.350	6.110	0.000	0.400
ELEVATOR CONSTRUCTOR		BLD		41.690	46.900	2.0	2.0	2.0	13.57	14.21	3.340	0.600
FENCE ERECTOR		ALL		32.210	34.110	1.5	1.5	2.0	8.840	10.02	0.000	0.900
GLAZIER		BLD		32.380	34.380	1.5	2.0	2.0	7.050	8.400	0.000	0.430
HT/FROST INSULATOR		BLD		29.990	30.990	1.5	1.5	2.0	5.050	10.09	0.000	0.280
IRON WORKER		ALL		29.840	32.830	1.5	1.5	2.0	6.600	11.90	0.000	0.350
LABORER		BLD		27.990	29.240	1.5	1.5	2.0	6.300	12.98	0.000	0.800
LABORER		HWY		29.550	30.550	1.5	1.5	2.0	6.300	13.28	0.000	0.800
LATHER		BLD		31.700	33.950	1.5	1.5	2.0	8.000	14.15	0.000	0.520
MACHINIST		BLD		45.350	47.850	1.5	1.5	2.0	7.260	8.950	1.850	0.000
MARBLE FINISHERS		BLD		29.580	0.000	1.5	1.5	2.0	7.200	8.200	0.000	0.000
MARBLE MASON		BLD		31.080	0.000	1.5	1.5	2.0	7.200	8.550	0.000	0.000
MILLWRIGHT		BLD		31.060	33.310	1.5	1.5	2.0	8.000	15.25	0.000	0.520
MILLWRIGHT		HWY		31.900	33.650	1.5	1.5	2.0	8.000	15.39	0.000	0.520
OPERATING ENGINEER		ALL	1	38.600	0.000	1.5	1.5	2.0	8.000	9.500	0.000	0.850
OPERATING ENGINEER		ALL	2	24.750	0.000	1.5	1.5	2.0	8.000	9.500	0.000	0.850
OPERATING ENGINEER		ALL	3	39.600	0.000	1.5	1.5	2.0	8.000	9.500	0.000	0.850
PAINTER		ALL		34.460	35.960	1.5	1.5	2.0	7.200	4.480	0.000	0.600
PAINTER SIGNS		ALL		34.460	35.960	1.5	1.5	2.0	7.200	4.480	0.000	0.600
PILEDRIVER		BLD		32.700	34.950	1.5	1.5	2.0	8.000	14.15	0.000	0.520
PILEDRIVER		HWY		33.100	34.850	1.5	1.5	2.0	8.000	14.15	0.000	0.520
PIPEFITTER		BLD		39.400	41.900	1.5	1.5	2.0	7.000	11.45	0.000	1.020
PLASTERER		BLD		31.000	33.000	1.5	1.5	2.0	7.200	10.77	0.000	0.500
PLUMBER		BLD		39.400	41.900	1.5	1.5	2.0	7.000	11.45	0.000	1.020
ROOFER		BLD		29.950	31.450	1.5	1.5	2.0	9.250	8.400	0.000	0.240
SHEETMETAL WORKER		BLD		35.740	37.740	1.5	1.5	2.0	8.700	13.72	0.000	0.520
SPRINKLER FITTER		BLD		37.120	39.870	1.5	1.5	2.0	8.420	8.500	0.000	0.350
STONE MASON		BLD		31.320	32.820	1.5	1.5	2.0	7.200	11.57	0.000	0.850
SURVEY WORKER	->NOT IN EFFECT			ALL	29.550	30.550	1.5	1.5	2.0	6.300	10.34	0.000	0.800
TERRAZZO FINISHER		BLD		29.580	0.000	1.5	1.5	2.0	7.200	8.200	0.000	0.000
TERRAZZO MASON		BLD		31.080	0.000	1.5	1.5	2.0	7.200	8.550	0.000	0.000
TILE LAYER		BLD		30.700	32.950	1.5	1.5	2.0	8.000	13.65	0.000	0.520
TILE MASON		BLD		31.080	0.000	1.5	1.5	2.0	7.200	8.550	0.000	0.000
TRUCK DRIVER		ALL	1	34.100	37.770	1.5	1.5	2.0	11.40	5.440	0.000	0.250
TRUCK DRIVER		ALL	2	34.600	37.770	1.5	1.5	2.0	11.40	5.440	0.000	0.250
TRUCK DRIVER		ALL	3	34.820	37.770	1.5	1.5	2.0	11.40	5.440	0.000	0.250
TRUCK DRIVER		ALL	4	35.140	37.770	1.5	1.5	2.0	11.40	5.440	0.000	0.250
TRUCK DRIVER		ALL	5	36.060	37.770	1.5	1.5	2.0	11.40	5.440	0.000	0.250
TRUCK DRIVER		O&C	1	27.280	30.220	1.5	1.5	2.0	11.40	5.440	0.000	0.250
TRUCK DRIVER		O&C	2	27.680	30.220	1.5	1.5	2.0	11.40	5.440	0.000	0.250
TRUCK DRIVER		O&C	3	27.860	30.220	1.5	1.5	2.0	11.40	5.440	0.000	0.250

TRUCK DRIVER	O&C	4	28.110	30.220	1.5	1.5	2.0	11.40	5.440	0.000	0.250
TRUCK DRIVER	O&C	5	28.250	30.220	1.5	1.5	2.0	11.40	5.440	0.000	0.250
TUCKPOINTER	BLD		31.320	32.820	1.5	1.5	2.0	7.200	11.57	0.000	0.850

Legend:
RG (Region)
TYP (Trade Type - All,Highway,Building,Floating,Oil & Chip,Rivers)
C (Class)
Base (Base Wage Rate)
FRMAN (Foreman Rate)
M-F>8 (OT required for any hour greater than 8 worked each day, Mon through Fri.
OSA (Overtime (OT) is required for every hour worked on Saturday)
OSH (Overtime is required for every hour worked on Sunday and Holidays)
H/W (Health & Welfare Insurance)
Pensn (Pension)
Vac (Vacation)
Trng (Training)

Explanations

COLES COUNTY

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

Oil and chip resealing (O&C) means the application of road oils and liquid asphalt to coat an existing road surface, followed by application of aggregate chips or gravel to coated surface, and subsequent rolling of material to seal the surface.

EXPLANATION OF CLASSES

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

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

CERAMIC TILE FINISHER, MARBLE FINISHER, TERRAZZO FINISHER

Assisting, helping or supporting the tile, marble and terrazzo mechanic by performing their historic and traditional work assignments required to complete the proper installation of the work covered by said crafts. The term "Ceramic" is used for naming the classification only and is in no way a limitation of the product handled. Ceramic takes into consideration most hard tiles.

ELECTRONIC SYSTEMS TECHNICIAN

Installation, service and maintenance of low-voltage systems which utilizes the transmission and/or transference of voice, sound, vision,

or digital for commercial, education, security and entertainment purposes for the following: TV monitoring and surveillance, background/foreground music, intercom and telephone interconnect, field programming, inventory control systems, microwave transmission, multi-media, multiplex, radio page, school, intercom and sound burglar alarms and low voltage master clock systems.

Excluded from this classification are energy management systems, life safety systems, supervisory controls and data acquisition systems not intrinsic with the above listed systems, fire alarm systems, nurse call systems and raceways exceeding fifteen feet in length.

SURVEY WORKER - Operated survey equipment including data collectors, G.P.S. and robotic instruments, as well as conventional levels and transits.

TRUCK DRIVER - BUILDING, HEAVY AND HIGHWAY CONSTRUCTION
Class 1. Drivers on 2 axle trucks hauling less than 9 ton. Air compressor and welding machines and brooms, including those pulled by separate units, truck driver helpers, warehouse employees, mechanic helpers, greasers and tiremen, pickup trucks when hauling materials, tools, or workers to and from and on-the-job site, and fork lifts up to 6,000 lb. capacity.

Class 2. Two or three axle trucks hauling more than 9 ton but hauling less than 16 ton. A-frame winch trucks, hydrolift trucks, vactor trucks or similar equipment when used for transportation purposes. Fork lifts over 6,000 lb. capacity, winch trucks, four axle combination units, and ticket writers.

Class 3. Two, three or four axle trucks hauling 16 ton or more. Drivers on water pulls, articulated dump trucks, mechanics and working forepersons, and dispatchers. Five axle or more combination units.

Class 4. Low Boy and Oil Distributors.

Class 5. Drivers who require special protective clothing while employed on hazardous waste work.

TRUCK DRIVER - OIL AND CHIP RESEALING ONLY.

This shall encompass laborers, workers and mechanics who drive contractor or subcontractor owned, leased, or hired pickup, dump, service, or oil distributor trucks. The work includes transporting materials and equipment (including but not limited to, oils, aggregate supplies, parts, machinery and tools) to or from the job site; distributing oil or liquid asphalt and aggregate; stock piling material when in connection with the actual oil and chip contract. The Truck Driver (Oil & Chip Resealing) wage classification does not include supplier delivered materials.

OPERATING ENGINEERS - BUILDING, HEAVY AND HIGHWAY CONSTRUCTION
Class 1. Draglines, Derricks, Shovels, Gradalls, Mechanics, Tractor Highlift, Tournadozer, Concrete Mixers with Skip, Tournamixer, Two Drum Machine, One Drum Hoist with Tower or Boom, Cableways, Tower Machines, Motor Patrol, Boom Tractor, Boom or Winch Truck, Winch or Hydraulic Boom Truck, Tournapull, Tractor Operating Scoops, Bulldozer, Push Tractor, Asphalt Planer, Finishing Machine on Asphalt, Large Rollers on Earth, Rollers on Asphalt Mix, Ross Carrier or similar Machine, Gravel Processing Machine, Asphalt Plant Engineer, Paver Operator, Dredging Equipment, or Dredge Engineer, or Dredge Operator, Central Mix Plant Engineer, CMI or similar type machine, Concrete Pump, Truck or Skid Mounted, Engineer or Rock Crusher Plant, Concrete

Plant Engineer, Ditching Machine with dual attachment, Tractor Mounted Loaders, Hydro Crane, Standard or Dinkey Locomotives, Scoopmobiles, Euclid Loader, Soil Cement Machine, Back Filler, Elevating Machine, Power Blade, Drilling Machine, including Well Testing, Caissons, Shaft or any similar type drilling machines, Motor Driven Paint Machine, Pipe Cleaning Machine, Pipe Wrapping Machine, Pipe Bending Machine, Apsco Paver, Boring Machine, (Head Equipment Greaser), Barber-Greene Loaders, Formless Paver, (Well Point System), Concrete Spreader, Hydra Ax, Span Saw, Marine Scoops, Brush Mulcher, Brush Burner, Mesh Placer, Tree Mover, Helicopter Crew (3), Piledriver-Skid or Crawler, Stump Remover, Root Rake, Tug Boat Operator, Refrigerating Machine, Freezing Operator, Chair Cart- Self-Propelled, Hydra Seeder, Straw Blower, Power Sub Grader, Bull Float, Finishing Machine, Self-Propelled Pavement Breaker, Lull (or similar type Machine), Two Air Compressors, Compressors hooked in Manifold, Chip Spreader, Mud Cat, Sull-Air, Fork Lifts (except when used for landscaping work), Soil Stabilizer (Seaman Tiller, Bo Mag, Rago Gator, and similar types of equipment), Tube Float, Spray Machine, Curing Machine, Concrete or Asphalt Milling Machine, Snooper Truck-Operator, Backhoe, Farm Tractors (with attachments), 4 Point Lift System (Power Lift or similar type), Skid-Steer (Bob Cat or similar type), Wrecking Shears, Water Blaster.

Class 2. Concrete Mixers without Skips, Rock Crusher, Ditching Machine under 6', Curbing Machine, One Drum Machines without Tower or Boom, Air Tugger, Self-Propelled Concrete Saw, Machine Mounted Post Hole Digger, two to four Generators, Water Pumps or Welding Machines, within 400 feet, Air Compressor 600 cu. ft. and under, Rollers on Aggregate and Seal Coat Surfaces, Fork Lift (when used for landscaping work), Concrete and Blacktop Curb Machine, One Water Pump, Oilers, Air Valves or Steam Valves, One Welding Machine, Truck Jack, Mud Jack, Gunnite Machine, House Elevators when used for hoisting material, Engine Tenders, Fireman, Wagon Drill, Flex Plane, Conveyor, Siphons and Pulsometer, Switchman, Fireman on Paint Pots, Fireman on Asphalt Plants, Distributor Operator on Trucks, Tampers, Self-Propelled Power Broom, Striping Machine (motor driven), Form Tamper, Bulk Cement Plant, Equipment Greaser, Deck Hands, Truck Crane Oiler-Driver, Cement Blimps, Form Grader, Temporary Heat, Throttle Valve, Super Sucker (and similar type of equipment).

Class 3. Power Cranes, Truck or Crawler Crane, Rough Terrain Crane (Cherry Picker), Tower Crane, Overhead Crane.

Other Classifications of Work:

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

LANDSCAPING

Landscaping work falls under the existing classifications for laborer, operating engineer and truck driver. The work performed by landscape plantsman and landscape laborer is covered by the existing

classification of laborer. The work performed by landscape operators (regardless of equipment used or its size) is covered by the classifications of operating engineer. The work performed by landscape truck drivers (regardless of size of truck driven) is covered by the classifications of truck driver.

The General Conditions, Supplementary Conditions and Division 1, General Requirements are hereby made a part of each division and section of the project specifications.

1. GENERAL.

1.01 REQUIREMENTS INCLUDE.

A. Work covered by contract documents is delineated on the Drawings and specified in the Project Manual, consisting generally of the following:

Construction of a new pre-engineered metal building having a footprint of approximately 33,800 square feet including spaces finished for offices as well as spaces for equipment maintenance and storage on a previously undeveloped site.

B. The City of Mattoon will complete the following items in advance of the start of construction for this contract:
1. Construct the entrance on Dewitt Avenue East. (Done.)
2. All demolition work shown on Plan Sheet C1.01. (July 15 estimated completion.)
3. Relocation of the existing ditch and 12" field tile. (Done.)
4. Removal of the existing field tile under the proposed building. (July 15 estimated completion.)
5. Removal and replacement of the compressible soil under the proposed building foundations. (July 15 estimated completion.) the upper layers of the existing soil.
6. The sanitary sewer crossing at the relocated ditch shown on Note 9 on Plan Sheet C1.03. (Done.)

C. The City of Mattoon will complete all of the exterior concrete work, except as noted below, after completion of this project. The Contractor shall complete the following items:
1. The Concrete Stoops shown on Plans Sheet C1.02 and the Structural Drawings.
2. The concrete Sidewalk and Curb shown on Plan Sheet C1.02 and the Architectural Drawings.

D. The Contractor shall complete all of the remaining earthwork for the site. This includes the embankment under the proposed building, parking areas, and roadways, as well as the excavation and embankment for the detention basin. Embankment material may be obtained from City stockpiles located on the site, City stockpiles located on Old State Road ½ mile west of 9th Street, and/or from City stockpiles located at 2521 N. 6th Dtreet (CSO SatelliteTreatment Facility currently under construction). All of the embankment material under the building shall be takenfrom the east City stockpile on Old State Road. The Contractor shall load, haul, place, and compact the embankment material.

Earthwork shall be completed to +/- 0.10 feet of the proposed elevations shown in the plans. A total pavement and subbase thickness of 11" shall be assumed for all paving work to be performed by the City.

The Contractor is not required to perform any grading, shaping, or seeding in the relocated ditch, or on that portion of the site east of the relocated ditch.

E. The Contractor shall complete all of the remaining work in the plans and specifications in order to complete the proposed site improvements and building.

1.02 DEFINITIONS. The following terms are used throughout the contract documents. The work will be governed in accord with the definitions.

A. Fabricated: Fabricated pertains to items specifically assembled or made of selected materials or components to meet individual design requirements.

B. Manufactured: Manufactured means standard units, usually mass produced by an established manufacturer of the respective item.

C. Provide: Provide means furnish and install.

D. Shop fabricated or shop made: Shop fabricated or shop made refers to item made by the Contractor in his own shop.

1.03 CONTRACT. This project shall be accomplished using a single prime contract.

1.04 CONTRACT TIME.

A. The embankment under the proposed building and the construction of the detention basin shall be completed by October 31, 2016.

B. The remainig work shall be completed within one year of the date of the Notice to Proceed. The project is being paid from existing City funds. There is no outside funding for this contract.

1.05 PERMITS. Prime Contractor shall apply for and pay for all permits relating to the construction of the work of this project.

1.06 PRODUCTS

A. No Asbestos Containing Materials or Other Hazardous Materials Shall be Furnished.

B. No paint containing lead shall be furnished.

1.07 CONTRACTOR USE OF PREMISES.

A. Confine operations at site to area permitted by:
   1. Law.
   2. Permits.
   3. Contract.
   4. Owner's representative.
      a. Confer with Owner's representative and obtain full knowledge of all sites rules and regulations affecting work.
      b. Conform to site rules and regulations while engaged in project construction.
      c. Site rules and regulations take precedence over others that may exist outside such jurisdiction.
      d. Employee list: The Owner's representative may examine Contractor's list of employees, including those of his subcontractors and their agents.
      e. Vehicle use: Rigidly enforce the following:
         1) Keep all vehicles, mechanized or motorized equipment locked at all times when parked and unattended on Owner's premises.
         2) Do not, under any circumstances, leave any vehicle unattended with motor or engine running, or with ignition key in place.
         3) Parking: Permitted only in areas designated by Owner's representative.
         4) All traffic control subject to Owner's representative's approval.

B. Do not unreasonably encumber site with materials or equipment.

C. Do not load structure with weight that will endanger structure.

D. Assume full responsibility for protection and safekeeping of products stored on premises.

E. Move all stored products or equipment which interfere with operations of Owner.

F. Obtain and pay or use of additional storage or work area needed for operations.

G. Contractors and A/E's will provide reasonable access to the site and shall not prohibit nor interfere with lawfully conducted inspections or site visits by properly identified representatives of regulatory agencies or collective bargaining units.
   1. Not withstanding the above, Owner's regulations governing site security shall be observed.
   2. All site visitors shall comply with personal protection regulations, including hard hats.

3. Reasonable proof of identification and signature to the visitor's log may be required of the visitors by the contractor's site superintendent.

H. Fire Protection:
1. Fires: Each Contractor shall prohibit the lighting of fires about the premises and use due diligence to see that such prohibition is enforced. Debris and waste materials shall not be burned at the construction site but shall be promptly removed to prevent the accumulation of combustibles on the site or within the building.
2. Welding and Cutting: It shall be the responsibility of each Contractor to take precautionary measures to prevent fire.
3. Flammables: Gasoline and other fuels shall be kept and handled in accord with NFPA and in UL Listed and Labeled safety cans and shall be stored away from hazardous work areas.

END 01010

1. GENERAL

1.01 REQUIREMENTS INCLUDE

A. Payment to Contractor(s) will be made monthly in accordance with the progress of the work and the terms of the Contract Documents.

B. Pay application documents shall be submitted to the Architect/Engineer no later than ten days after the end of the work period.

C. Within five days of receipt the A/E will review the Contractor's pay application documents for correctness; and either return them for corrections or approve and submit them to the Owner for payment.

1.02 APPLICATION FOR PAYMENT

A. The values claimed by the Contractor on each progress payment shall be equal to the Work completed and Materials Stored during the period covered by the application and shall not include the value such work or materials anticipated beyond the end of the period.

B. The Contractor shall submit his application for payment using the forms provided by the A/E (*or reasonable facsimiles of these forms)*. (See the sample forms which follow.)

C. The format of the application shall follow that which appears on the approved Schedule of Values. (See Section 01370).

D. The A/E will verify that the amounts requested in each category of work are appropriate to the stage of construction in evidence at the end of the work period defined in the Owner/Contractor Agreement.

1.03 STORED MATERIALS

A. DEFINITION

1. Stored Materials are items which have been appropriated for use on this specific project.

2. Stored Materials consists of items which become a permanent part of the project, including:

a. Materials
b. Equipment
c. Fixtures

B. The Owner will pay for all material stored for future use on its project. It is in fact encouraged in order that the construction schedule can be maintained or, in some instances, accelerated.

C. STORED ON-SITE: Materials stored on-site are not subject to any special provisions (except proper storage practices - See Section 01620).

D. STORED OFF-SITE

1. Materials stored off-site must be clearly tagged, identifying that they are for use on this project.

2. Pay Applications for such materials must be accompanied by a Certificate of Insurance.

3. Materials stored off-site are subject to the same protection requirements as those stored on-site (See Section 01620).

E. VERIFICATION:

1. The A/E will attest to the existence of stored materials claimed in the Contractor's Pay Application. Off-site storage areas shall be available for inspection by the A/E and/or the Owner's representative upon reasonable notice.

2. The Contractor shall reimburse the A/E for travel expenses associated with verification of materials stored off-site. Travel costs include mileage (at the rate of $0.58 per mile) and travel time (at the rate of 2.8 times the A/E employee's Salary).

F. FORMAT

1. The value claimed for materials, equipment, fixtures or furnishings appropriated to this project during the period covered by a specific pay application shall be entered in column F of the Application for Payment (on the appropriate line).

2. The value of stored material shall be included with work in place and placed in column 4 of all subsequent Applications for Payment.

1.04 WAIVERS OF LIEN

A. Partial Lien Waivers

1. Beginning with the second payment request, and with each succeeding payment request, the Contractor shall submit to the Architect/Engineer partial lien waivers as follows:

   a. Contractor: a waiver in an amount equal to the total amount paid to him on the previous month's pay request.
   b. Subcontractors: a waiver from each subcontractor that was included in the previous month's pay request, in an amount at least equal to the value claimed on the previous month's pay request less retainage. This retainage shall not exceed the percentage retained by the Owner of the Contractor's payment.
   c. Suppliers: a waiver from each supplier that was included in the previous month's pay request, in an amount at least equal to the value claimed on the previous month's pay request less retainage. This retainage shall not exceed the percentage retained by the Owner of the Contractor's payment.

2. See the sample Partial Lien Waiver form which follows ***(Pay Document C)***.

B. FINAL LIEN WAIVERS: The Contractor's request for final payment shall include:

1. From the Contractor: a Final Lien Waiver in an amount equal to the total amount of his contract, including all Change Orders.

2. From Subcontractors: a Final Lien Waiver in an amount equal to the total value of his work on the project, including all change orders.

3. From Suppliers: a Final Lien Waiver in an amount equal to the total value of all materials furnished to the project, including all change orders.

4. See the sample Final Lien Waiver form which follows ***(Pay Document E)***.

1.05 CONTRACTOR'S AFFIDAVIT OF RELEASE OF LIENS

A. Beginning with the second request for payment and with each succeeding request for payment, the Contractor shall certify that to the best of his knowledge, the waivers of lien provided represent all those that have or may have liens against the Owner's property which would arise out of the

performance of this contract, with any exceptions noted.

B. The Contractor shall make his final Release of Liens conditional upon receipt of final payment.

C. See the sample form which follows ***(Pay Document B)***.

1.06 CONTRACTOR'S AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS

A. The Contractor's final request for payment shall be accompanied by an affidavit which certifies that he has paid in full all obligations arising out of his performance of this contract, noting any exceptions.

B. See the sample form which follows ***(Pay Document D)***.

1.07 SUMMARY

A. The **first** request for payment shall consist of an original and one copy of the Application and Certification for Payment ***(Pay Document A)***.

B. **Subsequent** requests for payment shall consist of:

1. An original + one copy of the Application and Certification for Payment ***(Pay Document A)***.

2. An original + one copy of the Contractor's Affidavit of Release of Liens ***(Pay Document B)***.

3. An original + one copy of all required partial lien waivers ***(Pay Document C)***.

C. The **Final** Request for Payment shall consist of:

1. An original + one copy of the Application and Certification for Payment ***(Pay Document A)***.

2. An original + one copy of the Contractor's Affidavit of Release of Liens ***(Pay Document B).***

3. An original + one copy of the Contractor's Affidavit of Payment of Debts and Claims ***(Pay Document D)***.

4. An original + one copy of all required final lien waivers ***(Pay Document E)***.

1.08 FORMS: The following pages are copies of the forms referenced in this section. Copies for Contractor use are available from the Architect/Engineer.

END 01027

Payment Document A
Contractor's Application & Certificate for Payment

Project Name:

Contractor:

Contract For:

Application No.:

Covering the period:

Name & Address of Owner:

Name & Address of A/E:

The Upchurch Group, Inc.
123 N. 15th St.
Mattoon, Illinois 61938
Phone: 217/235-3177; FAX 217/258-6115

Summary of Application for Payment (Greater detail shown on Supporting Data Sheet)

1. Original Contract Amount:. . . . . _____
2. Net Change by Change Orders:. . . . . _____
3. Contract Sum to Date:.. . . . . _____
4. Total Completed & Stored to Date:. . . . . _____
5. Retainage:
   _____% of Completed Work: _____
   _____% of Stored Material: _____
   Total amount retained:. . . . . _____
6. Total Earned Less Retainage:.. . . . . _____
7. Amount(s) previously paid:. . . . . _____
8. Total Earned Less Previous Payments & Retainage:. . . . . ***(Current)*** _____
9. Balance to become Due, including Retainage:. . . . . _____

Contractor's Certification

The undersigned Contractor certifies that to the best of his/her knowledge, information and belief, the Work covered by this Application for Payment has been completed in accordance with the Contract Documents and that the amount identified as"current" above is now due.

Contractor's Signature:_____; Date: _____

Notary Section

Notarized in the State of Illinois; County of _____. Subscribed and sworn to before me this

_____ day of _____ in the year _____.

Notarized by _____; by my signature:_____

My Commission expires:

Change Order Summary

	Additions	Deductions	No Change
Approved previous to this Application			
Approved during the current period			
No. Dated:			
No. Dated:			
No. Dated:			
No. Dated:			
Net Change by Change Orders, to Date			

Architect/Engineer Certification

In accordance with the Contract Documents, based on-site observations and the data comprising this Application for Payment, the Architect/Engineer certifies to the Owner that to the best of the A/E's knowledge, information and belief, the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents (except for those items already noted as being deficient but have not yet been remedied), and the Contractor is entitled to payment of the amount certified below:

Amount Certified: $_____. Certified by: _____

This Certificate is not negotiable. The amount certified is payable only to the Contractor whose name appears near the top of page one of this Application for Payment. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under the Contract for this project.

In the event that the amount certified differs from the amount claimed by the Contractor as "Current", an explanation is provided below:

Payment Document A
Contractor's Application & Certificate for Payment

Supporting Data - First Page

1 Name of Contractor, Sub-contractor or Material Supplier.	2 Description of labor performed, material stored or work subcontracted.	3 Total contract to date. (CSV plus change orders)	4 Work completed and material stored		5 Total retained Including this application	6 Previous payments	7 New amount requested Column 4 minus (columns 5 + 6)	8 Balance to become due Column 3 minus (columns 6 + 7)
			%	Dollar value				
Totals (or subtotals if page 4 is needed)								

Payment Document A
Contractor's Application & Certificate for Payment

Supporting Data - Continuation Page

1 Name of Contractor, Sub-contractor or Material Supplier.	2 Description of labor performed, material stored or work subcontracted.	3 Total contract to date. (CSV plus change orders)	4 Work completed and material stored		5 Total retained Including this application	6 Previous payments	7 New amount requested Column 4 minus (columns 5 + 6)	8 Balance to become due Column 3 minus (columns 6 + 7)
			%	Dollar value				
Subtotals brought forward								
Totals (or subtotals if additional page 4 is needed)								

Payment Document B
Contractor's Affidavit of Release of Liens

Project Name:

Contractor: Contract For:

Submitted with Payment Application No.: Dated:

Name & Address of Owner:

Name & Address of A/E:

The Upchurch Group, Inc.
123 N. 15th St.
Mattoon, Illinois 61938
Phone: 217/235-3177; FAX 217/258-6115

Contractor's Sworn Statement

State of: County of:

The Contractor, whose signature appears below, hereby certifies that to the best of his/her knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached to this document include the Contractor, All Subcontractors, all suppliers of materials, all suppliers of equipment and all performers of Work, labor or services who have or may have liens against any property of the Owner arising in any manner out of the performance of the Contract for this Project.

Exceptions: (If none, write "None".)

For the Contractor: _____ _____

Signature Printed name and title

Notary Section

Notarized in the State of Illinois; County of _____. Subscribed and sworn to before me this _____ day of _____ in the year _____.

Notarized by _____; by my signature:_____

My Commission expires:

Payment Document C
Contractor's or Supplier's Waiver of Lien to Date

State of: County of:

To Whom it many concern:

Whereas the undersigned has been employed by: _____
Name of Contractor

to furnish for the premise known as: _____
Name of Project

which is located at: _____

of which the Owner is: _____

The undersigned, for and in consideration of:

_____ Dollars ($_____)

and other good and valuable considerations, the receipt of which is hereby acknowledged, do(es) hereby waive and release any and all lien or claim or right of lien under the statutes of the state in which the premises is located, relating to Mechanic's Liens, on account of labor or services, materials, fixtures, apparatus or machinery heretofore ***furnished to this date*** by the undersigned for the premises described above.

Given under _____ hand and seal this _____ day of _____, 20_____.

By: _____
Name, address and telephone number of Sole Ownership, Corporation or Partnership

Its: _____ _____ {SEAL}
Signature Printed name and title

Notary Section

Notarized in the State of Illinois; County of _____. Subscribed and sworn to before me this _____ day of _____ in the year _____.

Notarized by _____; by my signature:_____

My Commission expires:

Payment Document D
Contractor's Affidavit: Payment of Debts & Claims

Project Name:

Contractor: Contract For:

Submitted with Final Payment Application Dated:

Name & Address of Owner:

Name & Address of A/E:

The Upchurch Group, Inc.
123 N. 15th St.
Mattoon, Illinois 61938
Phone: 217/235-3177; FAX 217/258-6115

Contractor's Sworn Statement

State of: County of:

The Contractor, whose signature appears below, hereby certifies that, except as listed below, he/she has paid in full or has otherwise satisfied all obligations for all materials and equipment furnished, for all work, labor, and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract for this Project for which the Owner or his property might in any way be held responsible.

Exceptions: (If none, write "None".)

For the Contractor: _____ _____

Signature Printed name and title

Notary Section

Notarized in the State of Illinois; County of _____. Subscribed and sworn to before me this

_____ day of _____ in the year _____.

Notarized by _____; by my signature:_____

My Commission expires:

Payment Document E
Contractor's or Supplier's Final Waiver of Lien

State of: County of:

To Whom it many concern:

Whereas the undersigned has been employed by: _____
Name of Contractor

to furnish for the premise known as: _____
Name of Project

which is located at: _____

of which the Owner is: _____

The undersigned, for and in consideration of:

_____ Dollars ($_____)

and other good and valuable considerations, the receipt of which is hereby acknowledged, do(es) hereby waive and release any and all lien or claim or right of lien under the statutes of the state in which the premises is located, relating to Mechanic's Liens, on account of labor or services, materials, fixtures, apparatus or machinery heretofore ***furnished or which may be furnished at any time hereafter***, by the undersigned for the premises described above.

Given under _____ hand and seal this _____ day of _____, 20_____.

By: _____
Name, address and telephone number of Sole Ownership, Corporation or Partnership

Its: _____ _____ {SEAL}
Signature Printed name and title

Notary Section

Notarized in the State of Illinois; County of _____. Subscribed and sworn to before me this _____ day of _____ in the year _____.

Notarized by _____; by my signature:_____

My Commission expires:

1. GENERAL

1.01 DEFINITION

A Contract consists of a scope of work or service to be performed within a definite period of time for a specified compensation. Upon execution of the Owner/Contractor Agreement, the Contract may not be changed except as specified herein. When it becomes necessary to modify any of the elements of the contract (scope, time or compensation) a Change Order will be issued. The exception to this is detailed in article 1.06

1.02 REQUESTS FOR CHANGE

A. Requests for change may be either verbal or written.
B. The Contractor or Owner should make their requests to the Architect/Engineer.
C. Subcontractors, suppliers and others should make requests through the Contractor.
D. Requests should be made in a timely manner to allow for proper execution of Change Orders. Article 1.07 addresses the procedure when a change is needed more quickly than the normal procedure allows.

1.03 PROPOSAL REQUEST: The A/E will issue a Request for Proposal (sample form follows) to the Contractor.

1.04 CONTRACTOR'S PROPOSAL

A. The Contractor shall respond to the request by providing a Proposal to the A/E. In order for the Proposal to be properly evaluated, it shall include backup data in the form of detailed breakdown of all direct costs and markups Quotations from subcontractors and/or suppliers may also be required as backup data.

B. If a change affects work which is covered by unit prices in the Contract, such prices shall be used as the basis for adjustments to the contract sum.

C. Material:

1. Material is a direct cost that may be reduced, increased or remain unchanged as a result of a change in the Work. Material costs (both reductions and increases) shall be described in the Contractor's Proposal.

2. Material costs shall be listed as follows:

a. Material type
b. Quantity
c. Unit cost
d. Total cost
e. Miscellaneous cost(s) associated with a material.

3. If applicable, taxes associated with materials may be included.

D. Labor:

1. Labor is a direct cost that may be reduced, increased or remain unchanged as a result of a change in the Work. Labor costs (both reductions and increases) shall be described in the Contractor's Proposal.

2. Labor costs can include:

a. Wages
b. Benefits
c. Workman's Compensation Insurance
d. Other statutory requirements (FUTA, SUTA, etc.)

E. Equipment

1. Equipment needed to accomplish the Work is a direct cost that may be reduced, increased or remain unchanged as a result of a change in the Work. Equipment costs (both reductions and increases) shall be described in the Contractor's Proposal.

2. Equipment costs can include:

a. Cost of equipment at a reasonable rate (hourly, daily, weekly, etc, as appropriate).
b. Cost of mobilization of equipment.
c. Cost of consumables associated with use of equipment.

F. Maximum allowable markup for Overhead and Profit

1. Prime Contractor:

a. If work is performed is performed by own forces: 18% of the direct costs (Materials + Labor + Equipment).
b. If work is performed is performed by a subcontractor: 6% of the subcontractor's direct costs (Materials + Labor + Equipment).

2. Subcontractor:

a. If work is performed is performed by own forces: 18% of the direct costs (Materials + Labor + Equipment).
b. If work is performed is performed by a sub-subcontractor: 6% of the sub-subcontractor's direct costs (Materials + Labor + Equipment).

1.04 EFFECT ON GUARANTEE/WARRANTY

A. When a proposed change may affect material, equipment, systems or other assemblies which have a specified guarantee or warranty other than the one year warranty described in Article 13.2.2 of the General Conditions, the Contractor shall submit to the A/E written evidence of the effect the proposed change would have on such guarantee or warranty. This evidence shall be written by an authorized representative of the entity which will be guaranteeing or warranting the material, equipment, system or other assembly. A form which can be used for this purpose is available from the A/E. A sample is included in this section.

B. Proposed changes which negatively affect such guarantees or warranties will not be approved.

1.05 EXECUTION OF CHANGE ORDER

A. The A/E will initiate a Change Order (sample form follows).
B. The A/E's signature expresses his approval of the change and its terms.
C. The Contractor's signature expresses his willingness to make the change and acceptance of the terms of the change.
D. The Owner's signature expresses his approval of the change, acceptance of the terms of the change and authorization to execute the change.

1.06 MINOR CHANGES

A. The Architect/Engineer may direct the Contractor to make a minor change which does not affect the contract sum, contract time or any guarantee/warranty.
B. Such supplemental instructions will be processed using written communication (sample form follows).

1.07 CONSTRUCTION CHANGE AUTHORIZATION

A. In order to expedite the work and avoid or minimize delays in the work which may affect the contract sum or contract time, the A/E may amend the contract documents (sample form follows).

B. The A/E's signature acknowledges the issuance of the directive and approval of the change.
C. The Contractor's signature expresses his willingness to make the change and confirms the cost and time data contained thereon.
D. The Owner's signature expresses his approval of the change, acceptance of the cost and time data and authorization to execute the change.

1.08 FORMS: The following pages are copies of the forms referenced in this section. Copies are available from the A/E.

END 01028

Request for Proposal

Number:

Project Name:

Project No:

Contract for:

Date Submitted:

Name & Address of Contractor:

Name & Address of Owner:

Name & Address of A/E:

The Upchurch Group, Inc.
123 North 15th Street
Mattoon, Illinois 61938
Phone: 217/235-3177; FAX 217/258-6115

This is a request for a proposal. Please submit an itemized proposal for changes in the Contract Sum and/or Time as required to effect the proposed modifications to the Contract Documents as described below.

This document is not an authorization to proceed with the work described below.

Description of the proposed modifications:

Attachments:

Change Order

Number:

Project Name:

Project No:

Contract for:

Date Initiated:

Name & Address of Contractor:

Name & Address of Owner:

Name & Address of A/E:

The Upchurch Group, Inc.
123 North 15th Street
Mattoon, Illinois 61938
Phone: 217/235-3177; FAX 217/258-6115

The Contract is changed as follows:

This Change Order is not valid until signed by the Owner, A/E and Contractor

Original Contract Sum . . . . . $
Net change by previously executed Change Orders. . . . . $
Contract Sum prior to this Change Order.. . . . . $
Change in Contract Sum due to this Change Order.. . . . . $
Contract Sum resulting from this Change Order. . . . . $

Change in length of Construction Period. . . . . days
Date of Substantial Completion as a result of this Change Order is . . . . . .

Architect	***Contractor***	***Owner***
Signature	Signature	Signature
Date signed	Date signed	Date signed

A/E's Supplemental Instructions

Project Name:

Project No:

Name & Address of Contractor:

Contract for:

Date Initiated:

Name & Address of Owner:

Name & Address of A/E:

The Upchurch Group, Inc.
123 North 15th Street
Mattoon, Illinois 61938
Phone: 217/235-3177; FAX 217/258-6115

The Work described below shall be accomplished in accordance with the Contract Documents. The efforts required to carry out these instructions shall be done without any modifications to the Contract with regard to Contract Sum or Contract Time. Before proceeding with these instructions, the Contractor shall indicate acceptance of these minor changes to the Work as being consistent with the Contract Documents.

Description of the proposed modifications:

Attachments:

Issued by Architect ***Accepted by Contractor***

Signature

Signature Date Signature

Construction Change Directive

Number:

Project Name:

Project No:

Contract for:

Date Initiated:

Name & Address of Contractor:

Name & Address of Owner:

Name & Address of A/E:

The Upchurch Group, Inc.
123 North 15th Street
Mattoon, Illinois 61938
Phone: 217/235-3177; FAX 217/258-6115

The Contractor is hereby directed to make the following modification(s) to the Contract:

Proposed Adjustments

Change in Contract Sum due to this Change Directive. . . . . $

Basis of proposed modification to the Contract Sum is:

☐ Lump sum change
☐ As provided in General Conditions
☐ By unit price: $_____ per _____
☐ As follows:

Proposed change in length of Construction Period. . . . . days

Architect	***Contractor***	***Owner***
Signature	Signature	Signature
Date signed	Date signed	Date signed

Effect on Guarantee/Warranty

Project Name:

Project No: Contract for: Date Initiated:

Name & Address of Contractor:

Name & Address of Guarantor/Warrantor:

Name & Address of Owner:

Name & Address of A/E:

The Upchurch Group, Inc.
123 North 15th Street
Mattoon, Illinois 61938
Phone: 217/235-3177; FAX 217/258-6115

The entity identified above as ***Guarantor/Warrantor*** is furnishing or providing:

Identify the material, equipment, systems or other assemblies being furnished or provided for this project.

The Guarantor/Warrantor has examined Request for Proposal No. ____ and has determined that:

☐ The proposed change will not have any effect on the guarantee or warrantee specified for this project.

☐ The proposed change is not acceptable with regard to the guarantee or warrantee specified for this project for the following reason(s):

Representing the Guarantor/Warrantor:

Signature

Printed Name

Printed Name

1. GENERAL

1.01 DEFINITION

A Contract consists of a scope of work or service to be performed within a definite period of time for a specified compensation. Upon execution of the Owner/Contractor Agreement, the Contract may not be changed except as specified herein. When it becomes necessary to modify any of the elements of the contract (scope, time or compensation) a Change Order will be issued. The exception to this is detailed in article 1.06

1.02 REQUESTS FOR CHANGE

A. Requests for change may be either verbal or written.
B. The Contractor or Owner should make their requests to the Architect/Engineer.
C. Subcontractors, suppliers and others should make requests through the Contractor.
D. Requests should be made in a timely manner to allow for proper execution of Change Orders. Article 1.07 addresses the procedure when a change is needed more quickly than the normal procedure allows.

1.03 PROPOSAL REQUEST: The A/E will issue a Request for Proposal (sample form follows) to the Contractor.

1.04 CONTRACTOR'S PROPOSAL

A. The Contractor shall respond to the request by providing a Proposal to the A/E. In order for the Proposal to be properly evaluated, it shall include backup data in the form of detailed breakdown of all direct costs and markups Quotations from subcontractors and/or suppliers may also be required as backup data.

B. If a change affects work which is covered by unit prices in the Contract, such prices shall be used as the basis for adjustments to the contract sum.

C. Material:

1. Material is a direct cost that may be reduced, increased or remain unchanged as a result of a change in the Work. Material costs (both reductions and increases) shall be described in the Contractor's Proposal.

2. Material costs shall be listed as follows:

a. Material type
b. Quantity
c. Unit cost
d. Total cost
e. Miscellaneous cost(s) associated with a material.

3. If applicable, taxes associated with materials may be included.

D. Labor:

1. Labor is a direct cost that may be reduced, increased or remain unchanged as a result of a change in the Work. Labor costs (both reductions and increases) shall be described in the Contractor's Proposal.

2. Labor costs can include:

a. Wages
b. Benefits
c. Workman's Compensation Insurance
d. Other statutory requirements (FUTA, SUTA, etc.)

E. Equipment

1. Equipment needed to accomplish the Work is a direct cost that may be reduced, increased or remain unchanged as a result of a change in the Work. Equipment costs (both reductions and increases) shall be described in the Contractor's Proposal.

2. Equipment costs can include:

a. Cost of equipment at a reasonable rate (hourly, daily, weekly, etc, as appropriate).
b. Cost of mobilization of equipment.
c. Cost of consumables associated with use of equipment.

F. Maximum allowable markup for Overhead and Profit

1. Prime Contractor:

a. If work is performed is performed by own forces: 18% of the direct costs (Materials + Labor + Equipment).
b. If work is performed is performed by a subcontractor: 6% of the subcontractor's direct costs (Materials + Labor + Equipment).

2. Subcontractor:

a. If work is performed is performed by own forces: 18% of the direct costs (Materials + Labor + Equipment).
b. If work is performed is performed by a sub-subcontractor: 6% of the sub-subcontractor's direct costs (Materials + Labor + Equipment).

1.04 EFFECT ON GUARANTEE/WARRANTY

A. When a proposed change may affect material, equipment, systems or other assemblies which have a specified guarantee or warranty other than the one year warranty described in Article 13.2.2 of the General Conditions, the Contractor shall submit to the A/E written evidence of the effect the proposed change would have on such guarantee or warranty. This evidence shall be written by an authorized representative of the entity which will be guaranteeing or warranting the material, equipment, system or other assembly. A form which can be used for this purpose is available from the A/E. A sample is included in this section.

B. Proposed changes which negatively affect such guarantees or warranties will not be approved.

1.05 EXECUTION OF CHANGE ORDER

A. The A/E will initiate a Change Order (sample form follows).
B. The A/E's signature expresses his approval of the change and its terms.
C. The Contractor's signature expresses his willingness to make the change and acceptance of the terms of the change.
D. The Owner's signature expresses his approval of the change, acceptance of the terms of the change and authorization to execute the change.

1.06 MINOR CHANGES

A. The Architect/Engineer may direct the Contractor to make a minor change which does not affect the contract sum, contract time or any guarantee/warranty.
B. Such supplemental instructions will be processed using written communication (sample form follows).

1.07 CONSTRUCTION CHANGE AUTHORIZATION

A. In order to expedite the work and avoid or minimize delays in the work which may affect the contract sum or contract time, the A/E may amend the contract documents (sample form follows).

B. The A/E's signature acknowledges the issuance of the directive and approval of the change.
C. The Contractor's signature expresses his willingness to make the change and confirms the cost and time data contained thereon.
D. The Owner's signature expresses his approval of the change, acceptance of the cost and time data and authorization to execute the change.

1.08 FORMS: The following pages are copies of the forms referenced in this section. Copies are available from the A/E.

END 01028

Request for Proposal

Number:

Project Name:

Project No:

Contract for:

Date Submitted:

Name & Address of Contractor:

Name & Address of Owner:

Name & Address of A/E:

The Upchurch Group, Inc.
123 North 15th Street
Mattoon, Illinois 61938
Phone: 217/235-3177; FAX 217/258-6115

This is a request for a proposal. Please submit an itemized proposal for changes in the Contract Sum and/or Time as required to effect the proposed modifications to the Contract Documents as described below.

This document is not an authorization to proceed with the work described below.

Description of the proposed modifications:

Attachments:

Change Order

Number:

Project Name:

Project No:

Contract for:

Date Initiated:

Name & Address of Contractor:

Name & Address of Owner:

Name & Address of A/E:

The Upchurch Group, Inc.
123 North 15th Street
Mattoon, Illinois 61938
Phone: 217/235-3177; FAX 217/258-6115

The Contract is changed as follows:

This Change Order is not valid until signed by the Owner, A/E and Contractor

Original Contract Sum . . . . . $
Net change by previously executed Change Orders. . . . . $
Contract Sum prior to this Change Order.. . . . . $
Change in Contract Sum due to this Change Order.. . . . . $
Contract Sum resulting from this Change Order. . . . . $

Change in length of Construction Period. . . . . days
Date of Substantial Completion as a result of this Change Order is . . . . . .

Architect	***Contractor***	***Owner***
Signature	Signature	Signature
Date signed	Date signed	Date signed

A/E's Supplemental Instructions

Project Name:

Project No:

Name & Address of Contractor:

Contract for:

Date Initiated:

Name & Address of Owner:

Name & Address of A/E:

The Upchurch Group, Inc.
123 North 15th Street
Mattoon, Illinois 61938
Phone: 217/235-3177; FAX 217/258-6115

The Work described below shall be accomplished in accordance with the Contract Documents. The efforts required to carry out these instructions shall be done without any modifications to the Contract with regard to Contract Sum or Contract Time. Before proceeding with these instructions, the Contractor shall indicate acceptance of these minor changes to the Work as being consistent with the Contract Documents.

Description of the proposed modifications:

Attachments:

Issued by Architect ***Accepted by Contractor***

Signature

Signature Date Signature

Construction Change Directive

Number:

Project Name:

Project No:

Contract for:

Date Initiated:

Name & Address of Contractor:

Name & Address of Owner:

Name & Address of A/E:

The Upchurch Group, Inc.
123 North 15th Street
Mattoon, Illinois 61938
Phone: 217/235-3177; FAX 217/258-6115

The Contractor is hereby directed to make the following modification(s) to the Contract:

Proposed Adjustments

Change in Contract Sum due to this Change Directive. . . . . $

Basis of proposed modification to the Contract Sum is:

☐ Lump sum change
☐ As provided in General Conditions
☐ By unit price: $_____ per _____
☐ As follows:

Proposed change in length of Construction Period. . . . . days

Architect	***Contractor***	***Owner***
Signature	Signature	Signature
Date signed	Date signed	Date signed

Effect on Guarantee/Warranty

Project Name:

Project No: Contract for: Date Initiated:

Name & Address of Contractor:

Name & Address of Guarantor/Warrantor:

Name & Address of Owner:

Name & Address of A/E:

The Upchurch Group, Inc.
123 North 15th Street
Mattoon, Illinois 61938
Phone: 217/235-3177; FAX 217/258-6115

The entity identified above as ***Guarantor/Warrantor*** is furnishing or providing:

Identify the material, equipment, systems or other assemblies being furnished or provided for this project.

The Guarantor/Warrantor has examined Request for Proposal No. ____ and has determined that:

☐ The proposed change will not have any effect on the guarantee or warrantee specified for this project.

☐ The proposed change is not acceptable with regard to the guarantee or warrantee specified for this project for the following reason(s):

Representing the Guarantor/Warrantor:

Signature

Printed Name

Printed Name

1. GENERAL

1.01 REQUIREMENTS INCLUDE

A. Contractor comply with all laws, rules and regulations governing the work:
1. When Contractor observes that contract documents are at variance with specified codes, notify A/E in writing immediately. Architect/Engineer will issue all changes in accord with General Conditions.
2. When Contractor performs any work knowing or having reason to know that the work is contrary to such laws, rules and regulations and fails to so notify the Architect/Engineer, Contractor shall pay all costs arising therefrom. However, it is not be the Contractor's primary responsibility to make certain that the contract documents are in accordance with such laws, rules and regulations.

B. Related Requirements:
1. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to work of this Section.

1.02 DEFINITIONS & ABBREVIATIONS

A. Definitions:
1. Dates: Reference Codes, Regulations and Standards are the issue current at date of bidding documents unless otherwise specified.
2. Codes: Codes are rules, regulations or statutory requirements of government agencies.
3. Standards: Standards are requirements set by authorities, custom or general consent and established as accepted criteria.

B. Abbreviations:

1.	ADA	Americans with Disabilities Act.
2.	AGCI	Associated General Contractors in Illinois.
3.	ANSI	American National Standards Institute.
4.	ASHRAE	American Society of Heating, Refrigeration and Air-Conditioning Engineers.
5.	ASTM	American Society for Testing and Materials.
6.	AWWA	American Waterworks Association.
7.	IBC	International Building Code.
8.	CDB	Capital Development Board.
9.	FM	Factory Mutual Engineering Corporation.
10.	ICC	International Code Council.
11.	ICCB	Illinois Community College Board.
12.	IDOT	Illinois Department of Transportation.
13.	IDPH	Illinois Department of Public Health.
14.	IDPR	Illinois Department of Professional Regulation.
15.	NFPA	National Fire Protection Association.
16.	OSFM	Office of State Fire Marshal.
17.	SOS	Secretary of State.

1.03 QUALITY ASSURANCE

A. Architect/Engineer has designed the project with full knowledge of code requirements and has copies of all specified codes available for Contractor's inspection.

B. Contractor:
1. Ensure that copies of specified codes and standards are readily available to Contractor's personnel. Copies are available at Contractor's expense from source or publisher.
2. Ensure that Contractor's personnel are familiar with workmanship and installation requirements of specified codes and standards.

1.04 REGULATORY REQUIREMENTS

A. Source and requirements:

1. International Building Code, 2003 edition
2. International Maintenance Code, 2003 edition
3. International Fire Code, 2003 edition
4. International Mechanical Code, 2003 edition
5. NFPA National Electric Code
6. State of Illinois Plumbing Code
7. Illinois Accessibility Code 1997 Addition
8. Mattoon Zoning Ordinance

B. The Architect/Engineer may reference other codes or standards throughout the Project Manual when deemed appropriate for proper compliance with regulatory requirements.

END 01060.

1. GENERAL

1.01 REQUIREMENTS INCLUDE

A. Contractor: Note: Coordinating Contractor shall coordinate the work of this section from each of the other contractors.

1. ***Construction Schedules.*** Submit projected construction schedule for work to A/E within twenty (20) business days after preconstruction meeting. Maintain, coordinate and distribute schedule. Revise schedule(s) monthly.

2. ***Shop Drawings, Product Data & Samples***: Submit shop drawings, product data, installation instructions, samples, etc. as specified in the individual specification sections.

3. ***Schedule of Values***: Submit Schedule of Values to Architect/Engineer at least 15 business days prior to submitting first application for payment.
   a. Support values given with date to substantiate their correctness upon request by the A/E.
   b. Use Schedule of Values as only basis for application for payment.
   c. Payment for materials stored on or off site will be limited to those materials listed in Schedule of Values.

1.02 CONSTRUCTION SCHEDULE

A. Form. Prepare a standard horizontal bar chart.
1. Provide separate horizontal bar for each class of work, activity or long-lead equipment item.
2. Columns should follow table of contents fo Project Manual.

B. Content. Indicate complete sequence of construction by activity.
1. Shop drawings, product data and samples: Submittal dates and dates when reviewed copies will be required.
2. Decision dates for: Selection of finishes.
3. Product procurement date, fabrication time and delivery dates.
4. Dates for beginning, and completion of, each element of construction.

C. Updating. Update monthly. Indicate:
1. Progress of each activity since previous submission.
2. Projected completion dates for all activities.
3. Activities modified since previous submission.

D. Submission Requirements. Submit initial schedules within ten (10) business days after date of preconstruction meeting.
1. A/E will review schedules and return reviewed copy within ten (10) business days after receipt.
2. When required, re-submit within five (5) business days after return of reviewed copy.
3. Submit monthly updated schedules accurately depicting progress to first day of each month.

E. Distribution. Distribute copies of reviewed schedules to:
1. Owner
2. Architect/Engineer.
3. Job site file.
4. Subcontractors and suppliers on as needed-basis.

1.03 SHOP DRAWINGS, PRODUCT DATA, SAMPLES, ETC - DEFINITIONS

A. Shop drawings: Shop drawings are original drawings prepared by Contractor, subcontractor, sub-subcontractor, supplier or distributor, which illustrate some portion of the work, showing fabrication, layout, setting or erection details.
1. Prepared by qualified detailer.
2. Identify details by reference to sheet and detail numbers - shown on contract drawings.

3. Minimum sheet size: 8 1/2" x 11"
4. Reproductions for submittals: Opaque diazo or photocopy

B. Product data:
1. Manufacturer's standard schematic drawings:
   a. Modify to delete information which is not applicable to project.
   b. Supplement standard information to provide additional information applicable to project.
2. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data.
   a. Clearly mark each copy to identify pertinent materials, products or models.
   b. Show dimensions and clearances required.
   c. Show performance characteristics and capacities.
   d. Show wiring diagrams and controls.

1.04 SHOP DRAWINGS, PRODUCT DATA, SAMPLES, ETC. - SPECIFIED PRODUCTS LIST:

A. Within 15 business days after date of Notice of Award, submit to the Architect/Engineer (3) copies of complete list of all products which are proposed for installation.

B. Tabulate list of each specification section.

C. For products specified under reference standards, include with listing of each product:
1. Name and address of manufacturer.
2. Trade name.
3. Model or catalog designation.
4. Manufacturer's data.
   a. Performance and test data.
   b. Reference standards.

1.05 SHOP DRAWINGS, PRODUCT DATA, SAMPLES, ETC. - EXHIBIT SUBMITTAL:

A. Submit all exhibits within 15 business days after the preconstruction meeting.

B. Submit number of copies of shop drawings, product data and samples which contractor requires for distribution plus one copy which will be retained by Architect/Engineer.
1. Submittals can be submitted digitally by email in PDF format, except where color selections are to be made.
2. (3) Hard samples of manufacturers standard color selection will be submitted via mail or dropped off at A/E office.

C. Accompany submittals with transmittal letter, in duplicate, containing:
1. Date.
2. Project title and number.
3. Contractor's name and address.
4. The number of shop drawings, product data and samples submitted.
5. Notification of deviations from Contract.
6. Other pertinent data.

D. Submittals shall include:
1. Date and revision dates.
2. Project title and number.
3. Names of:
   a. Architect/Engineer.
   b. Subcontractor.
   c. Supplier.
   d. Manufacturer.
   e. Separate detailer when pertinent.
4. Identification of product or material.

5. Relation to adjacent structure or material.
6. Field dimensions, clearly identified as such.
7. Specification section and page number.
8. Applicable standards, such as ASTM number or ANSI.
9. A blank space, 5" x 3", for Architect/Engineer's stamp.
10. Identification of previously approved deviation(s) from contract documents.
11. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of field measurements and compliance with Contract.

1.06 SHOP DRAWINGS, PRODUCT DATA, SAMPLES, ETC. - RESUBMISSION REQUIREMENTS:

A. Shop drawings:
   1. Revise initial drawings as required and resubmit in accordance with submittal procedures.
   2. Indicate on drawings all changes which have been made in addition to those requested by Architect/Engineer.

B. Product data and samples: Submit new data and samples as required for initial submittal.

C. Make all resubmittals within ten business days after date of Architect/ Engineer's previous review.

1.07 SHOP DRAWINGS, PRODUCT DATA, SAMPLES, ETC - DISTRIBUTION OF SUBMITTALS AFTER REVIEW:

A. Contractor will distribute copies of shop drawings and product data which carry Architect/Engineer's stamp to:
   1. Contractor's file.
   2. Job site file.
   3. Record documents file.
   4. Other contractors.
   5. Subcontractors.
   6. Suppliers.
   7. Fabricators.

B. Distribute samples as directed in accordance with contract documents.

1.08 SHOP DRAWINGS, PRODUCT DATA, SAMPLES, ETC. - CONTRACTOR RESPONSIBILITIES:

A. Review shop drawings, product data and samples prior to submission to the next level of authority.
B. Verify:
   1. Field dimensions.
   2. Field construction criteria.
   3. Catalog numbers and similar data.
C. Coordinate each submittal with requirements of: The work and the contract documents.
D. Contractor's responsibility for errors and omissions in submittals is not relieved by Architect/Engineer's review of submittals.
E. Prior to submission notify Architect/Engineer in writing of all proposed deviations in submittals from contract requirements.
F. Contractor's responsibility for deviations in submittals from contract document requirements is not relieved by Architect/Engineer's review of submittals.
G. Do not begin any work which requires submittals without having Architect/Engineer's stamp and initials or signature indicating approval.
H. After Architect/Engineer's review, make response required by Architect/Engineer's stamp and distribute copies. Indicate by transmittal that copy of approved data has been distributed to installer.

1.09 SHOP DRAWINGS, PRODUCT DATA, SAMPLES, ETC. - ARCHITECT/ENGINEER'S DUTIES:

A. Review submittals within 10 business days.
B. Review for: Design concept of project and compliance with contract documents.
C. Review all request for proposed deviations.

D. Review of separate item does not constitute review of an assembly in which item functions.
E. Affix stamp, date and initials or signature certifying to review of submittal, and with instructions for contractor response.
F. Return submittals to Contractor for response or distribution.

1.10 SHOP DRAWINGS, PRODUCT DATA, SAMPLES, ETC. - SPECIFIED EXHIBIT SUBMITTALS: See individual specification sections (NOTE: the Architect/Engineer may require additional submittals which they deem necessary.)

1.11 SCHEDULE OF VALUES - FORM OF SUBMITTAL

A. Submit typewritten or computer generated Schedule of Values.
B. Use the CSV form provided by the A/E (*or reasonable facsimiles of these forms)*. (See the sample forms which follow.)
C. Use Project Manual Table of Contents as basis of format for listing costs of all work.

1.12 SCHEDULE OF VALUES - PREPARATION.

A. Itemize separate line item cost for each of following cost items:
   1. Overhead and profit.
   2. Bonds.
   3. Insurance.
   4. General Requirements.

B. Each work category shall appear as a separate line item. Identify work of:
   1. Contractor's own labor forces.
   2. All subcontractors.
   3. All major suppliers of products or equipment.

C. Break down installed costs into:
   1. Delivered cost of product (with taxes paid, if applicable)
   2. Labor cost, excluding overhead and profit.

D. Each item of work which has an installed value of more than $5,000 shall be a separate line item.
E. Round off figures to nearest dollar.
F. Make sum of total costs of all items listed in Schedule equal to total contract sum.

1.13 SCHEDULE OF VALUES - SUBMISSION REQUIREMENTS

A. Review and resubmittal. After review by Architect/Engineer, revise and resubmit Schedule as required. Follow original submittal procedure.
B. Update. Update Schedule of Values when directed by A/, change of subcontractor or supplier occurs or change of product or equipment occurs.
C. Forms. Following are sample forms to be used for the Schedule of Values. The second form is a continuation sheet to be used if required. They are available from the A/E.

END 01300.

Contractor's Schedule of Values

Project Name:

Project Number:

Name & Address of Contractor:

Contract for:

Date Submitted:

Name & Address of Owner:

Name & Address of A/E:

The Upchurch Group, Inc.
123 N. 15th Street
Mattoon, Illinois 61938
Phone: 217/235-3177; FAX 217/258-6115

Contractor, Subcontractor or Material Supplier	Description of Work or Material	Scheduled Value	% of Contract
Total (or Subtotal if Continuation page(s) is required)			

Contractor Section

Submitted by Contractor listed above in accordance with the provisions of the Contract Documents. Upon request by the A/E, contracts and other relevant documentation will be provided to substantiate this schedule of values.

For the Contractor: _____ _____

Signature — Printed name and title

Architect/Engineer Section

Reviewed and approved for certifying payment for work completed and materials stored. Approval of this schedule by the A/E in no way relieves the Contractor of his responsibility for the performance of the Work in accordance with the Contract Documents.

For the A/E: _____ _____

Signature — Date of approval

Contractor's Schedule of Values - Continuation Sheet

Contractor, Subcontractor or Material Supplier	Description of Work or Material	Scheduled Value	% of Contract
	Subtotal brought forward		
	Total (or Subtotal if additional Continuation page(s) is required)		

1. GENERAL

A. Contractor:

1. ***Temporary Office, Storage, and Telephone:***

   a. The General Contractor shall be responsible for providing a comfortable and clean office for use by all Contractors and Subcontractors on the job, and suitable space for storage of materials to be used by himself and his subcontractors.
   b. The General Contractor shall have a telephone installed in his office and shall pay for original installation and all monthly, local, and toll charges.
   c. Contractor for the mechanical trades shall provide storage space for their material as needed.
   d. All temporary buildings shall remain the property of the Contractor, and upon completion of the job shall be remove from the premises.

2. ***Temporary Utilities:*** Provide and maintain specified temporary utilities for specified times during construction period. Contractor to provide all utilities required by him which are in excess of those specified or exceed capacity of existing or permanent systems.

   a. Utilities for field offices, except those specifically identified as the provided by others.
   b. Temporary heat.
   c. Payment of all utility, telephone, and fuel bills, except charges specifically identified as provided by others.
   d. Temporary ventilation.
   e. Temporary power.
   f. Temporary lighting (work, security, safety, and lamps).

2. ***Temporary Sanitary Facilities:*** The General Contractor shall be responsible for providing sanitary facilities for use by all trades. The facilities shall be maintained in a clean and sanitary condition, and shall comply with the requirements of the Department of Public Health.

3. ***Construction Aids:*** Provide and maintain construction aids and equipment for personnel use and to facilitate execution of the work:

   a. Chutes.
   b. Cranes.
   c. Hoists.
   d. Platforms.
   e. Railings.
   f. Ramps.
   g. Runways.
   h. Stairs.
   i. Ladders
   j. Temporary Enclosure

   Provide and maintain for his own forces all other construction aids required to complete his work.

4. ***Barriers:*** Provide and maintain suitable barriers to:

   a. Prevent unauthorized entry to the construction area, including students and staff.
   b. Protect the work
   c. Protect adjacent facilities and utilities from construction operations.
   d. Do not interfere with existing traffic adjacent to the site.

   Remove when no longer needed, at completion of the work or as directed.

5. ***Temporary Environmental Controls:*** Provide controls over environmental conditions at the construction site and related areas under the Contractor's control. Remove physical evidence of temporary controls at completion of work or as directed.

6. ***Construction Cleaning:*** Provide cleaning and disposal of waste materials, debris and rubbish during construction.

1.02 TEMPORARY UTILITIES

A. Furnished by others: There are no existing utilities serving the project site. When service is established, the account shall be in the Owner's name for the following utilities that the Owner will furnish for use by the Contractor:

1. Electrical power
2. Natural Gas
3. Water
4. Telephone for toll-free calls only. (Toll calls paid for by caller, credit card only.)

B. Owner will pay all costs of consumables (except toll calls) used for construction purposes for utilities that it furnishes.

C. Contractor requiring Owner furnished services shall provide and pay for any extensions or modifications of services required by him, and for restoration of services at completion of work.

D. Use of permanent systems for construction purposes

1. Obtain Owner's prior written authorization. Contractor's request for authorization shall indicate:

a. Reason for use.
b. Conditions of use.
c. Which parts of the system may be used.
d. Modifications necessary.
e. Isolation of elements not authorized for use.
f. Approval of installing Contractor and of equipment manufacturer where extended warranties are involved.

2. Modifications necessary shall be at Contractor's expense, since use of permanent system is for Contractor's benefit.

3. Upon completion of need to use permanent system, or when directed by the A/E, the Contractor shall restore the permanent system to specified condition prior to substantial completion.

a. Provide all new filters in heating and ventilating systems.
b. Replace all burned out or defective lamps.
c. Repair or restore all damaged parts or components.
d. Clean all ducts and coils.

4. Owner's authorization for use of permanent systems will not relieve Contractor's responsibility for warranties in accordance with the General Conditions.

5. NOTE: The above does <u>not</u> prohibit installing Contractor from normal test and check-out of system.

1.03 DEBRIS CONTROL

A. Maintain all areas under Contractor's control free of extraneous debris.

B. Initiate and maintain a specific program to prevent accumulation of debris at construction site, storage and parking areas or along access roads and haul routes.

1. Provide containers for deposit of debris.
2. Prohibit overloading of trucks to prevent spillages on access and haul routes. Provide daily inspection of traffic areas to enforce requirements.

C. Scheduled collection and disposal of debris is specified in 01561. Provide additional collections and disposals of debris whenever regular schedule is inadequate to prevent accumulation.

1.04 POLLUTION CONTROL

A. Prevent contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations.

B. Provide equipment and personnel to perform emergency measures to contain all spillages and to remove contaminated soils or liquids. Excavate and dispose of all contaminated earth off-site. Replace with suitable compacted fill and topsoil.

C. Take special measures to prevent harmful substances form entering public waters. Prevent disposal of wastes, effluents, chemicals or other such substances adjacent to streams, or in sanitary or storm sewers.

D. Provide systems for control of atmospheric pollutants.

1. Prevent toxic concentrations of chemicals.
2. Prevent harmful dispersal of pollutants into the atmosphere.

2. PRODUCTS

2.01 CONSTRUCTION AIDS

A. Materials may be new or used. Comply with specified codes and standards.

B. Provide a weather-tight environment for continuing operations of materials installation that require specified temperature control.

2.02 BARRIERS. Materials may be new or used, suitable for purpose. Comply with specified codes and standards.

2.03 CLEANING EQUIPMENT

A. Provide covered containers for deposit of waste materials, debris, and rubbish.

B. Provide brooms and other tools necessary for proper cleaning during construction.

3. EXECUTION

3.01 CONSTRUCTION AIDS

A. Preparation. Consult with Architect/Engineer, review site conditions and factors which affect construction procedures and construction aids, including adjacent properties and public facilities which may be affected by execution of the work.

B. Removal

1. Remove temporary materials, equipment and service when construction needs can be met by authorized use of permanent construction or when authorized by the A/E.
2. Clean and repair damage caused by installation or use of temporary facilities.
3. Restore facilities used for temporary purposes to specified condition.

3.02 BARRIERS

A. Installation. Install facilities of a neat and uniform appearance.

B. Removal

1. Remove when authorized by the A/E.
2. Clean and repair damage caused by installation, fill and grade areas to original elevations and slopes (unless indicated otherwise), and clean the area.

3.01 CONSTRUCTION CLEANING

A. Cleaning

1. Maintain areas under Contractor's control free of waste materials, debris, and rubbish.
2. Periodically clean interior areas to provide suitable conditions for safe and healthy construction activities.
3. Broom clean interior areas prior to start of surface finishing. Continue cleaning on an as-needed basis.
4. Control cleaning operations so that dust and other particulates will not adhere to wet or newly-coated surfaces.

B. Disposal. Remove waste materials, debris, and rubbish from site periodically and dispose of off-site.

END 01500

1. GENERAL

1.01 REQUIREMENTS INCLUDE

A. Contractor provide:

1. ***Materials and equipment***
   1. Specified materials and equipment.
   2. Transportation and delivery.
   3. Equipment and personnel at site.

2. ***Storage and protection***
   1. Storage for materials and equipment to be installed in Project.
   2. Protection and security for stored materials and equipment, on and off site.

3. ***Product Substitutions***
   1. Base all bids on providing all products exactly as specified.
   2. For products specified only by reference or performance standards, select any product which meets or exceeds standards, by any manufacturers, subject to the Architect/Engineer's approval.
   3. For products specified by naming several products or manufacturers, select any product and manufacturer named.

1.02 MANUFACTURER'S INSTRUCTIONS

A. When contract documents require that installation shall comply with manufacturer's printed instructions, obtain and distribute copies of such instructions to all parties involved in the installation, including 1 copy to the Architect/Engineer for their files plus copies required by section 01700.

B. Maintain one set of complete instructions with the Project Record Documents at the jobsite during installation and until completion.

1.03 STORAGE OF MATERIALS OFF-SITE AUTHORIZATION. Off-site storage will be permitted only on Owner's prior written authorization in accordance with General Conditions.

1.04 SUBSTITUTIONS, BIDDER/CONTRACTOR OPTIONS

A. PRIOR TO BID OPENING: The Architect/Engineer will consider written requests to amend the bidding documents to add products not specified provided such requests are received at least 10 calendar day prior to bid opening date. Requests received after that time will not be considered. When a request is approved, the Architect/Engineer will issue an appropriate addendum not less than seven calendar days prior to bid opening date.

B. WITH BID: A bidder may propose substitutions with his bid by completing the Proposed Product Substitution List in the Bid Form, subject to the provisions stated thereon. Architect/Engineer will review Proposed Product Substitution List of low bidder and recommend approval or rejection by Owner prior to award of contract.

C. AFTER AWARD OF CONTRACT: No substitutions will be considered after Notice of Award except under one of more of the following conditions:

1. Substitutions required for compliance with final interpretations of code requirements or insurance regulations.
2. Unavailability of specified products, through no fault of Contractor.
3. Subsequent information discloses inability of specified product to perform properly or to fit in designated space.
4. Manufacturer/fabricator refusal to certify or guarantee performance of specified product as specified.
5. When a substitution would be substantially to Owner's best interests.

1.05 SUBSTITUTION REQUIREMENTS

A. Submit 3 copies of each request for substitution. Include in request:

1. Complete data substantiating compliance of proposed substitution with contract documents.
2. For products:
   a. Product identification, including manufacturer's name and address.
   b. Manufacturer's literature:
      1) Product description.
      2) Performance and test data.
      3) Reference standards.
   c. Samples.
   d. Name and address of similar projects on which product was used and date of installation.
3. For construction methods:
   a. Detailed description of proposed method.
   b. Drawings illustrating methods.
4. Itemized comparison of proposed substitution with product or method specified.
5. Data relating to changes in construction schedule.
6. Identify:
   a. Changes or coordination required.
7. Accurate cost data on proposed substitution in comparison with product or method specified.

B. In making request for substitution, bidder/contractor represents:

1. It has personally investigated proposed product or method and determined that it is equal or superior in all respects to that specified.
2. It will provide the same guarantee for substitution as for product or method specified.
3. It will coordinate installation of accepted substitutions into work, making all changes as may be required for work to be complete in all respects.
4. Cost data is complete and includes all related costs under its contract, but excludes:
   a. Architect/Engineer's redesign.
   b. Administrative costs of Architect/Engineer.
   c. Costs under separate contracts.
5. It will pay all additional costs and expenses for Owner, Architect/Engineer and other contractors.

C. Substitutions will not be considered when:

1. They are indicated or implied on shop drawings or product data submittals without formal request submitted in accordance with Paragraph 1.04.
2. Acceptance will require substantial revision of contract documents.

2. PRODUCTS

2.01 MATERIALS & EQUIPMENT INCORPORATED INTO THE WORK

A. Conform to project specifications and standards.

B. Comply with size, make, type and quality specified.

C. Manufactured and fabricated products:
1. Design, fabricate and assemble in accord with best engineering and shop practices.
2. Manufacture like parts of duplicate units to standard sizes and gages, to be interchangeable.
3. Two or more items of the same kind shall be identical from the same manufacturer.
4. All parts of systems shall be from the same manufacturer to the greatest extent practicable.
5. Adhere to equipment capacities, sizes and dimensions shown or specified unless variations are specifically approved by Change Order.

2.02 STORAGE & PROTECTION METHODS AND MATERIALS

A. Materials, equipment may be new or used, but shall be serviceable, adequate for required purpose, and shall not create unsafe conditions nor violate specified codes.

B. Protective materials
1. For duration of storage period, provide materials which will provide proper protection against the elements or other harmful environmental conditions. Materials may be new or used at Contractor's option, but shall be:
a. Of sufficient strength and durability for proposed use.
b. Recommended by manufacturer of products or equipment to be protected.
c. Non-staining.
d. Non-hazardous.

3. EXECUTION

3.01 TRANSPORTATION, DELIVERY & HANDLING

A. Arrange for transportation and deliveries of materials and equipment in accord with approved current construction schedules and in ample time to facilitate inspection prior to installation.

B. Coordinate deliveries to avoid conflict with work and conditions at site:
1. Work of Owner, or their use of premises.
2. Limitations of storage space.
3. Availability of equipment and personnel for handling products.

C. Deliver products in undamaged condition in original containers or packaging, with identifying labels intact and legible.

D. Clearly mark partial deliveries of component parts of assemblies or equipment to permit easy identification of parts and to facilitate assembly.

E. Immediately on delivery, inspect shipment to assure:
1. Product complies with Contract documents and Architect/Engineer approved submittals.
2. Quantities are correct.
3. Containers and packages are intact, labels are legible.
4. Products are properly protected and undamaged.

F. Provide equipment and personnel to handle products and equipment. Leave alone those furnished by Owner. Prevent damage to products or packaging.

G. Provide additional protection during handling to prevent scraping, marring or otherwise damaging products, equipment or surrounding surfaces.

H. Handle products and equipment in a manner to prevent bending or overstressing.

I. Lift packages, equipment or components only at designated lift points.

3.02 STORAGE & PROTECTION

A. Location: where authorized by Owner.
B. Installation
1. Mount fire extinguishers in prominent location with clear access to use.
2. Mount identifying signs adjacent to entrance doors, in conspicuous locations.

C. Limitations
1. Do not exceed capacity of structure.
2. Do not inhibit use of:
a. Fire exits.

b. Fire lanes.
c. Parking.
d. Owner's operations.

3. Store combustible materials in accordance with Fire Marshall's regulations.

D. Protection

1. Protect all products and equipment from damage.
2. Methods:
   a. Store moisture or water vulnerable materials off grade.
   b. Store finished products and equipment in an enclosed building, on or off site.
   c. Maintain integrity of shipping cartons until ready for installation
   d. Provide separate storage of combustible and non-combustible products.
   e. Follow storage recommendations of product and equipment manufacturers.
   f. Other methods shall be subject to Architect/Engineer's prior written approval.

END 01600

1. GENERAL

1.01 REQUIREMENTS INCLUDE - EACH CONTRACTOR

A. ***Final Cleaning***. Contractor provide final cleaning, including:
1. Supervise and coordinate the cleaning operations of all subcontractors on this project.
2. At Project completion, leave Project clean and ready for occupancy.

B. ***Project Record Documents***. Contractor:
1. At project site, maintain one copy of:
   a. Contract drawings.
   b. Project Manual.
   c. Interpretations and supplemental instructions.
   d. Addenda.
   e. Reviewed, approved shop drawings and product data.
   f. Other modifications to Contract.
   g. Field test records.
   h. All schedules.
   i. Correspondence file.
2. Store documents apart from documents used for field construction.
3. Maintain documents in clean, dry, legible condition.
4. Do not use record documents for field construction purposes.
5. Make documents available at all times for inspection by Architect/Engineer and Owner.

C. ***Operations and Maintenance Manuals***. Coordinating Contractor shall provide Operating and Maintenance Data in accordance with the Project Manual. Assigned Contractors shall cooperate with Coordinating Contractor to facilitate this by providing O&M data in the form of printed materials such as manufacturer's installation instructions, etc.

D. ***Warranties and Bonds***. Coordinating Contractor comply with project warranty and bond requirements as specified herein, including delivery of manufacturer warranty documents. Assigned Contractors shall cooperate with Coordinating Contractor by providing warranties, etc. stemming from the work of their Contract.

E. ***Training***. Each Contractor provide training to Owner's designated personnel regarding equipment and systems provided in the project.

1.02 SAFETY REQUIREMENTS DURING CLEANING OPERATIONS:

A. Standards: Maintain project in accord with following safety and insurance standards:
1. Federal and State regulations.
2. National Fire Protection Association (NFPA).

B. Hazards Control:
1. Store volatile wastes in covered metal containers and remove from premises daily.
2. Prevent accumulation of wastes which create hazardous conditions.
3. Provide adequate ventilation during use of volatile or noxious substances.

C. Conduct cleaning and disposal operations to comply with Federal and State anti-pollution laws.
1. Do not burn or bury rubbish and waste materials on project site.
2. Do not dispose of volatile wastes such as mineral spirits, oil or paint thinner in storm or sanitary drains.
3. Do not dispose of wastes into streams or waterways.

1.03 PROJECT RECORD DOCUMENTS

A. A set of project documents (plans and project manual) shall be maintained at the site by the Coordinating Contractor. Each Contractor shall mark up changes in their work to this set of documents.

B. Marking Devices. Provide felt tip marking pens for marking. Conform to the following color code.
   1. Red - General Work.
   2. Orange - Mechanical Work.
   3. Green - Electrical Work.

C. Recording
   1. Label each document "PROJECT RECORD DOCUMENTS" in 2" high printed letters.
   2. Keep record documents current.
   3. Do not permanently conceal any work until specified information has been recorded.
   4. Contract Drawings: Legibly mark to record actual construction:
      a. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
      b. Field changes of dimension and detail.
      c. Changes made by change order.
      d. Details not on original Contract Drawings.
   5. Specifications and addenda: Legibly mark up each section to record:
      a. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
      b. Changes made by change order or field order.
      c. Other matters not originally specified.
   6. Shop drawings: Maintain as record documents; legibly annotate drawings to record changes made after review.

D. Submission requirements
   1. At completion of project, deliver record documents to Architect/Engineer.
   2. Accompany submittal with transmittal letter, in duplicate, containing:
      a. Date.
      b. Project title and number.
      c. Contractor's name and address.
      d. Title and number of each record document.
      e. Certification that each document as submitted is complete and accurate.
      f. Signature of Contractor, or his authorized representative.

1.04 OPERATING AND MAINTENANCE MANUALS

A. General
   1. Contractor shall compile product data related to the maintenance and operation of products and equipment provided under the contract. Provide O & M information for products specified in specific work sections of the project manual.
   2. Each manual shall include a typewritten table of contents for each volume, arranged in project manual order.
   3. For each product, include the name, address and telephone number of subcontractor, maintenance contractor, and parts vendor.
   4. Supplement product data with drawings to clearly illustrate the relationship of component parts and control and flow diagrams. Include a copy of each warranty, bond, and service contract. Submit two copies of each manual.

B. For Materials and Finishes
   1. Provide full information on products, including catalog number, size, composition, color and texture designations, and information for reordering special-manufactured products.
   2. Provide manufacturer's recommendations for cleaning agents/methods and recommended cleaning and maintenance schedule.

C. For Equipment & Systems. Provide operating characteristics and limiting conditions; performance curves, engineering data, and tests.
   1. Include operating procedures: start-up, break-in, routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; summer and winter

operating instructions; maintenance procedures; servicing and lubrication schedule.

2. Provide manufacturer's operating and maintenance instructions; sequence of operation by control manufacturer; manufacturer's parts list, illustrations, assembly drawings, and diagrams for maintenance; predicted life of parts subject to wear; recommended spare parts.
3. Provide as-installed control diagrams by control manufacturer. Each Contractor's coordination drawings with color-coded piping diagrams and charts of valve tag numbers, with location and function of each valve.

D. For Electric & Electronic Systems. Provide circuit directories of panel boards and color-coded wiring diagrams.

E. Submittal. Assigned Contractors shall submit their information to the Coordinating Contractor for assembling and submittal to the A/E. Provide two copies.

1.05 WARRANTIES AND BONDS

A. *General*. The Contractor warrants that all work provided under the contract will be in conformance with the contract and free from defects in workmanship, materials, and equipment for a period of one year or such longer period as may be specified in the contract documents, except as provided below.

Warranty time periods shall commence with the date which appears on the Certificate of Substantial Completion of the whole, or any part of the project. The warranty time period for any incomplete or uncorrected work including punch list work at the time of substantial completion shall commence with the date of final completion.

B. *Extended Warranties*. The responsible Contractor warrants that its workmanship, materials and equipment for those building systems subject to seasonal loads will be in conformance with the contract and free from defects for a period of two years, commencing with the date of the certificate of substantial completion. This includes, but is not limited to, heating, ventilating, air conditioning, temperature control and test and balance work, as specified in the project manual.

C. *Latent Defects*. On demand by the Owner at any time within the ten year period following substantial completion or final acceptance, if applicable, the Contractor shall promptly repair or replace all defective or non-conforming work resulting from, or constituting, latent defects, fraud, fraudulent concealment or gross negligence. The Owner will give timely notice of such defects.

D. *Prompt Repair*. Upon notice from the Owner or along with the A/E of such defects or non-conforming work, the Contractor shall promptly visit the site in the company of the Owner or the Owner's representative to determine the extent of all defects or nonconforming work.

The Contractor shall provide all labor, material and equipment to promptly repair or replace the defective or non-conforming work.

The repair shall include all adjacent work not necessarily provided by the Contractor but damaged as a result of such defects or non-conforming work or as a result of remedying them. If the Contractor does not promptly repair or replace defective or non-conforming work, The Owner may repair or replace such work and charge the cost thereof to the Contractor.

Work which is repaired or replaced by the Contractor shall be inspected and shall be warranted by the Contractor in accordance with this Article. The warranties set forth herein are in addition to all warranties or guarantees expressed or implied by operation of law, statute or ordinance.

E. *Commercial Warranties*. The Contractor shall deliver all commercial warranties received from manufacturers prior to final completion but this shall not reduce Contractor's obligations under this Article.

F. *Other Warranties*. The Owner may require the Contractor to furnish other warranties as specified in the Project Manual.

G. *Submittal*. Each Contractor shall submit executed warranties and bonds to the Coordinating Contractor. Coordinating Contractor shall assemble and submit one original signed copy, bound with a table of contents to the A/E for approval and transmittal to the Owner.

1.06 TRAINING. Provide formal training in operation and maintenance of all building systems. Provide O & M manuals to serve as the basis for Owner training. Submit records of dates, duration of each training session, material covered and documented attendance of Owner.

2. PRODUCTS

2.01 MATERIALS

A. Select and use all cleaning materials and equipment with care to avoid scratching, marring, defacing, staining or discoloring surfaces cleaned.

B. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

3. EXECUTION

3.01 FINAL CLEANING

A. Employ experienced workmen for final cleaning.
B. Remove grease, dust, dirt, stains, labels, fingerprints, protection and other foreign materials from sight-exposed interior and exterior finished surfaces; polish surfaces so designated to specified finish. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of concealed spaces to ensure performance.
C. Repair, patch and touch up marred surfaces to specified finish, to match adjacent surfaces.
D. General Contractor soft broom clean all exposed concrete surfaces clean; other paved areas with soft or stiff broom as directed. Rake clean other surfaces on grounds.
E. General Contractor sweep and mop clean all flooring within the project work site, vacuum clean all carpet.
F. Maintain finally cleaned areas until project, or designated portion thereof, is accepted by Owner.

END 01700

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor to provide:
   a. Polyvinyl chloride (PVC) pipe for domestic water/fire supply line.
   b. Ductile iron fittings.
   c. Valve and boxes.

1.02 REGULATORY REQUIREMENTS

A. The work shall be done in conformance with the Standard Specifications for Water and Sewer Main Construction in Illinois, Fifth Edition, May 1996. Copies may be obtained from the following.

1. Illinois Society of Professional Engineers
   1304 South Lowell Avenue
   Springfield, IL 62704
2. Illinois Municipal League
   1220 South Seventh Street
   Springfield, IL 62703
3. The Associated General Contractors of Illinois
   3219 Executive Park Drive
   P.O. Box 2579
   Springfield, IL 62708

1.03 SUBMITTALS

A. Submit shop drawings, including the manufacturer's literature, for each type and size of pipe being provided.

B. Submit shop drawings, including the manufacturer's literature, for each valve size being provided, and for valve box.

C. Submit shop drawings, including the manufacturer's literature, for all the types and sizes of pipe fittings being provided.

D. Submit complete calculations of the lengths of thrust restrained pipe required at each pipe fitting to restrain the pipe against the forces developed under maximum test pressure without considering any thrust blocking.

E. Submit shop drawings, including manufacturer's literature, for each type of fire hydrant being provided.

1.04 PROJECT RECORD DOCUMENTS

A. In accord with Section 01700:

1. Accurately record location of pipe runs, connections, and invert elevations.
2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
3. Disinfection Report - accurately recorded:
   a. Type and form of disinfectant used.
   b. Date and time of disinfection injection start and time of completion.
   c. Test locations.
   d. Initial and 24-hour disinfection residuals (quantity in treated water) in parts per million (PPM) for each outlet tested.
   e. Date and time of flushing start and completion.
   f. Disinfectant residual after flushing in PPM for each outlet tested.

4. Document water service bacterialogical and pressure testing per Illinois Plumbing Code requirements.

2. PRODUCTS

2.01 WATER MAIN AND WATER SERVICE, ALL DIAMETERS

A. Under these items, provide water main products as shown on the drawings in accordance with the following portion of the Standard Specifications and according to the following requirements that modify the Standard Specifications:

1. DIVISION IV WATER DISTRIBUTION
   a. Section 40 – Pipe for Water Mains and Service Connections.

B. The following requirements modify or are in addition to the Standard Specifications:

1. Water Main:
   a. Water main on this project shall be PVC pipe that meets the performance requirements for AWWA C900, “Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. through 12 in. for Water Distribution” and shall be furnished in cast-iron pipe equivalent outside diameters. Pipe shall be furnished in 20' laying lengths and shall be rated for pressure Class 150.
2. Pipe Joint Restraint:
   a. Where required by the Contract Documents, pipe joints shall be restrained against thrust forces with either cast-in-place PC concrete thrust blocks or with restrained joint piping.
   b. Mechanical-joint pipe restraint shall be incorporated into the design of the follower gland at all ductile iron fittings.
      1) The restraining mechanism shall consist of individually actuated wedges that increase their resistance to pull-out as pressure or external forces increase. The device shall be capable of full mechanical joint deflection during assembly and the flexibility of the joint shall be maintained after burial. Torque limiting twist-off nuts shall be used to insure proper actuation of the restraining wedges.
      2) The joint restraint ring and its wedging components shall be made of ductile iron conforming to ASTM A536. The wedges shall be ductile iron heat treated to a minimum hardness of 370 BHN.
      3) Dimensions of the gland shall be such that it can be used with the standardized mechanical joint bell conforming to ANSI/AWWA C111/A21.11 and ANSI/AWWA C153/A21.53 of the latest revision.
      4) The mechanical joint restraint shall have a rated working pressure of 250 psi minimum.
      5) The devices shall be listed by Underwriters Laboratories and approved by Factory Mutual.
   c. Water main pipe joints may also be restrained by installation of PVC pipe with restrained joints that meet or exceed the performance requirements of AWWA (American Water Works Association) Standard C900, is FM (Factory Mutual) approved, complies with NSF (National Sanitation Foundation) Standard No. 61 for potable water service, UNI-BELL UNI-B-13, and is listed by UL (Underwriters Laboratories, Inc.).

2.02 VALVES AND BOXES (ALL DIAMETERS)

A. Under these items, provide valves and boxes as shown on the drawings and in accordance with the following portion of the Standard Specifications:

1. DIVISION IV WATER DISTRIBUTION

a. Section 42 - Gate Valves for Water Mains.
b. Section 44 - Valve Vaults and Boxes for Water Mains and Water Service.

3. EXECUTION

3.01 WATER MAIN AND WATER SERVICE, ALL DIAMETERS

A. Under these items, install water main as shown on the drawings and in accordance with the following portion of the Standard Specifications:

1. DIVISION II EXCAVATION AND CLEAN UP
   a. Section 20 – Excavation and Backfill for Underground Conduits.
   b. Section 22 – Finishing and Clean Up for Underground Conduits.
2. DIVISION IV WATER DISTRIBUTION
   a. Section 41 – Pipe Installation for Water Mains. Water mains shall be pressure tested per Section 41. Domestic water mains only shall be disinfected per Section 41.

3.02 VALVE AND BOX

A. Under these items, install valves and boxes as shown on the drawings and in accordance with the following portion of the Standard Specifications:

1. DIVISION IV WATER DISTRIBUTION
   a. Section 42 – Gate Valves for Water Mains.
   b. Section 44 - Valve Vaults and Boxes for Water Mains and Water Services.

END OF 02600

1. GENERAL

1.01 DESCRIPTION

A. Base Bid: Contractor provide:

a. Sanitary & storm sewer piping and structures.

1) Sewer pipes, in trench.
2) Granular bedding and initial backfill.
3) Select granular backfill.
4) Covers and frames.
5) Manholes

1.02 SYSTEM DESCRIPTION

A. Description of Systems: Manholes, inlets, grates, covers and frames, and pipes shall be installed at the locations and elevations as shown and specified for the purpose of conveying surface water.

B. Tolerances:

1. Install drainage piping and structures at the locations and elevations indicated on the plans.

2. Pipe inverts, and lawn area grates and cover elevations shall be within ±0.05' of the elevations shown, but shall provide proper drainage and shall not interfere with other work.

3. Pavement area grate and cover elevations shall be within ±0.01' of the elevations shown on the plans except as directed by the Architect/Engineer.

1.03 REFERENCES

A. IDOT Standard Specifications for Road and Bridge Construction, adopted January 1, 2007 and all updates current at the time of bidding except the references to “Method of Measurement” and “Basis of Payment” shall not apply. All references made to “Engineer” shall be changed to “Architect/Engineer”.

B. Standard Specifications for Water & Sewer Construction in Illinois, Sixth Addition, July 2009.

C. American Society for Testing and Materials (ASTM): A48-83 Class 35 B, Specification for Gray Iron; D 3034, for Poly Vinyl Chloride (PVC) pipe; D2321-83a, Standard Practice for Installation of Flexible Thermoplastic Sewer Pipe; C76-85a, Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe; F405-85, Specification for Corrugated Polyethylene (PE) Tubing and Fittings; F449-76, Standard Recommended Practice for Subsurface Installation of Corrugated Thermoplastic Tubing for Agriculture Drainage or Water Table Control.

D. American Water Works Association (AWWA): C151 (ANSI A21.51) for ductile iron pipe; bell and spigot or mechanical joints.

E. ASTM C412 - Concrete Drain Tile.

F. ASTM D2729 - Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

1.04 SUBMITTALS

A. Submit shop drawings and product data, and manufacturer's installation instructions under provisions of Section 01300.

B. Submit shop drawings indicating dimensions, layout of piping, high and low points of pipe inverts,

gradient of slope between corners and intersections.

1.05 PROJECT RECORD DOCUMENTS

A. Submit documents under provisions of Section 01700.

B. Accurately record location of pipe runs, connections, cleanouts and invert elevations.

2. PRODUCTS

2.01 MATERIALS - SANITARY & STORM SEWERS

A. Manholes shall be Precast Concrete, ASTM C76-85 a min Class 2 Wall B.

B. Sanitary Sewer Pipe: The pipe used for sanitary sewers will be one of the following requirements: Poly Vinyl Chloride (PVC) SDR35, solid wall; ABS SDR35, solid wall; or ductile cast iron pipe, thickness class 52.

C. Poly Vinyl Chloride (PVC) sewer pipe and fittings meeting the requirements of ASTM D-3034. The pipe and fittings meeting the requirements of ASTM D-3034. The pipe and fitting compound shall meet ASTM Specification D-1784. The joints shall meet ASTM Specification D-3212.

2.02 FILL MATERIAL

A. Under Pavement or Sidewalk to 2' Outside of pavement or Sidewalk

1. Trench backfill in accordance with Section 208 of the IDOT Standard Specifications.

B. Outside 2' from pavement or sidewalk

1. Aggregate per article 1003.04 of the IDOT Standard Specifications from 4" below pipe to middle of pipe.
2. Compacted type D per section 02200 fill material above middle of pipe for rigid pipe and above the initial backfill for flexible pipe.

3. EXECUTION

3.01 SANITARY & STORM SEWER WORK

A. Installation

1. Sanitary sewer piping, in trench:

a. Backfill trenches as specified in Section 02200, up to the bottom of the topsoil layer as specified. Backfill trenches in existing and proposed paved areas and within 2' of curbs or paved areas with granular material, Type C.

b. PVC pipe shall be installed in accordance with ASTM D2321. The embedment (bedding, haunching and initial backfill to at least 6 inches above the top of the pipe) shall be Type C material.

B. Testing for Acceptance: All testing of sanitary sewers will be done by the Air Testing Method in accordance with Section 31-1.11 of the Standard Specifications. All Flexible Thermoplastic Pipe will be deflection tested in accordance with Section 31-1.11B of the Standard Specifications for Water and Sewer Main Construction in Illinois.

C. Manholes, frames, grates and covers:

1. Precast concrete sanitary manholes shall be installed on bedding and foundation in accordance with Section 32-3 of the Standard specifications for Water and Sewer Main Construction in Illinois. Structures placed under or within 2' of a paved surface shall be backfilled to within 6" of the surface with granular backfill as specified in Section 2200, Type C. A continuous 1" bituminous mastic rope shall be installed between layers of precast. New and existing pipes shall be extended into new and existing drainage structures, as required, and sealed all around by means of a pre-set rubber gasket insert or by packing with non-shrink grout. Excavation and backfill shall be as specified in Section 02200.

2. Iron frames with grates or covers shall be installed level centered and at the elevations shown with a continuous 1" bituminous mastic rope installed between the steel frame and the precast concrete drainage structure.

3.04 COORDINATION:

A. Coordinate the work of this Section with the work of other Contractors in order to minimize the disturbance of existing and proposed work.

B. All disturbed areas over sewer trenches and around sewer structures in lawn areas shall be restored by the Contractor created the disturbance.

END 02700

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor, provide concrete work shown and specified for:
1. Footings.
2. Slabs.
3. Formwork.
4. Steel Reinforcement.
5. Admixtures.
6. Accessories.
7. Expansion & Control Joints.
8. Concrete Placement.
9. Finishing.
10. Curing.
11. Portland Cement Concrete Curb and Gutter

1.02 QUALITY ASSURANCE

A. Qualifications of Ready-Mix Plant: IDOT certified concrete plant.

B. Regulatory Requirements: See 01060.

1. UBC - 1991.
2. ACI.
3. CRSI.
4. Illinois Steel Products Procurement Act (83-1030).

1.03 REFERENCES

A. Codes and Standards: Cited Codes and Standards, or specified parts thereof, govern the work. In conflict between specified Codes and Standards and project specifications or Regulatory Requirements, make written request to Architect/Engineer for decision regarding governing requirements. Do not perform any work until receipt of Architect/ Engineer's written instructions.

1. American Concrete Institute (ACI):

a. ACI 301 - Specifications for Structural Concrete for Buildings, including all ACI and ASTM Standards therein referenced.

b. ACI 318 - Building Code Requirements for reinforced concrete.

2. Concrete Reinforcing Standard Practice.

a. CRSI Manual of Standard Practice.

b. CRSI Recommended Practice for Placing Reinforcing.

B. Manufacturer's Catalogs: The catalogs of specified manufacturers, current at date of bidding documents, are incorporated herein by reference to the same effect as if repeated herein in full.

C. Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction, adopted January 1, 2007 and all updates current at time of bidding, except references to “Method of Measurement: and “Basis of Payment” shall be deleted. All references to “Engineer” change to “Architect/Engineer”.

1.04 SUBMITTALS: In accord with 01300, submit:

A. Reinforcement, placement, laps, connections.

B. Product Data: Admixtures, Surface treatment and Grout.

1.05 DELIVERY, STORAGE & HANDLING

A. Deliver all products in sufficient quantity and time to maintain approved construction schedule. Deliver all packaged materials in manufacturer's original containers, with all labels and markings intact and legible. Remove materials and damaged containers immediately from the site.

B. Store all products in a secure, dry location, out of way of construction operations. Store materials on pallets, a minimum of 4 in. off the ground. Prevent intermixing of granular materials.

C. Handle materials in a manner to prevent damage to the materials, to other stored products, to existing construction and project work. Follow product manufacturer's instructions.

1.06 SEQUENCING/SCHEDULING: Schedule all work in a manner to maintain the approved construction schedule. Cooperate and coordinate with other contractors to ensure timely completion and to eliminate interferences.

2. PRODUCTS

2.01 MATERIALS

A. Formwork: Comply with ACI 301 and ACI 347.

1. Plywood forms: Any species, sound, undamaged sheets. Thickness in accord with ACI 347.

2. Lumber forms: Any species, sound, undamaged boards. Grade stamp clearly visible. Size suitable for supporting weight of fresh concrete with minimum deflection.

3. Steel forms: Suitably stiffened to support weight of fresh concrete with minimum deflection.

4. Form Ties: Removable or snap-off metal; adjustable length.

5. Contractor may omit forms for footings when soil is suitable and excavations have been accurately made; otherwise, use forms. Obtain Architect/Engineer's written approval before placing any concrete against earth sides.

B. Metallic Reinforcement:

1. Bars: ASTM A615, Grade 60 yield grade billet-steel, deformed bars; uncoated finish.

2. Welded steel wire fabric: ANSI/ASTM A185 plain type in flat sheets; uncoated finish.

3. Accessories:

a. Tie Wires: FS QQ-W-461, Annealed steel, black, minimum 15 gage.

b. Chairs, bolsters, bar supports, spacers: Sized and shaped for strength and support of reinforcement during installation and placement of concrete. Include load bearing pad on bottom to prevent vapor retarder puncture.

C. Cement: ASTM C150, Portland cement; grey Type I normal.

D. Fine and Coarse Aggregates: ASTM C33. Fine Aggregate: natural, hard, clean sand. Coarse

Aggregate: crushed stone or gravel.

E. Water: Clean, fresh, potable. Free from oils or other substances injurious to concrete or reinforcement.

F. Admixtures:

1. Air Entrainment: ASTM C260.
2. Calcium Chloride: NOT PERMITTED.

G. Expansion and Construction Joints:

1. Formed Construction Joints: Galvanized steel, tongue and groove type, with removable top strip exposing sealant trough; knockout holes spaced 6 in o.c., ribbed spikes with tongue to fit top screed edge.

2. Joint Filler. ANSI/ASTM D1752, Type II; regranulated cork particles impregnated and bound with asphalt or resins; resiliency recovery of 95% if not compressed more than 50% or original thickness.

H. Accessories:

1. Bonding Agent: Two component epoxy resin.

2. Vapor Retarder: Sheet barrier type; Black or translucent polyethylene film for under floor slab on grade application; 6 mil thick.

3. Curing Materials:

a. Absorptive Mat: Burlap-polyethylene, 8 oz./sq. yd., bonded to prevent separation during use.

b. Membrane Curing Compound: ASTM C309, Type 1

4. Polyethylene Film: ASTM D2103, 6 mil thick, clear color. Do not use on hard troweled surfaces.

5. Sealing of Interior Exposed Concrete. For interior concrete floors which are to remain exposed to view (see Room Finish Schedule): provide Sonneborn's Sonothane HS, Concrete Impressions CI-MPRS-30 or Tamms Clearseal 300.

2.02 CONCRETE MIX

A. Comply with ASTM C94. In conflict between referenced Standard and project specifications, notify Architect/Engineer immediately. Confirm notification in writing. Do not proceed with concrete work until Architect/Engineer provides written direction.

B. Provide specified concrete as follows:

1. For footings, foundation walls, and floor slabs:

a.	Compressive Strength @ 28 days:	3,500 psi (minimum)
b.	Air Entrainment:	4 - 8 percent
c.	Slump:	2 - 4 inches

2. For sidewalks, curbs, and gutters:

a.	Compressive Strength @ 28 days:	3,500 psi (minimum)
b.	Air Entrainment:	4 - 8 percent
c.	Slump:	2 - 4 inches

C. If at any time during construction concrete strength falls below specified strength, or proves unsatisfactory for any reason, immediately notify Architect/Engineer. Confirm notification in writing.

D. Use air entrainment admixture for all concrete that will be exposed to freeze / thaw cycling.

E. Do not use other admixtures without Architect/Engineer's prior written authorization.

2.03 REINFORCING BARS

A. General Conditions:

1. All fabrication shall be done at the mill or shop prior to shipment.

2. No substitutions shall be obtained before the bars or fabric are fabricated or ordered. At the time of shipment, the surface of all reinforcement bars, fabric, and prestressing strands shall be free from loose mill scale, dirt, oil, grease, or other foreign substances. A light coating of rust, which may form during storage under acceptable conditions at the mill or warehouse, will not be deemed cause for rejection. Stocks of reinforcement bars, fabric or strand either at the mill or warehouse, which have not been protected in an adequate manner during storage, will not be accepted.

3. At the time the bars and fabric are placed in the work, they shall be free from rust which pits the surface or scales off dirt, oil grease, or other foreign substances. A light coating of rust, which may form during storage on the work under acceptable conditions, will not be deemed cause to require cleaning. Thin powdery rust and tight rust is not considered detrimental and need not be removed.

B. Reinforcement Bars:

1. Reinforcement bars, including epoxy coated reinforcement bars, shall conform to the requirements of ASTM A615, Grade 60 deformed bars.

3. EXECUTION

3.01 INSPECTION: Inspect all prior construction and conditions under which work will be performed. Report in writing to Architect/Engineer all conditions that would adversely affect proper execution of the work. Do not proceed with the work until all unsatisfactory conditions have been corrected.

3.02 FORMWORK

A. Design: Design, engineer, construct, maintain and remove all formwork in accord with ACI 301, Chapter 4.

B. Preparation:

1. Verify lines, levels and measurements before proceeding with formwork.

2. Hand trim sides and bottoms of earth forms; remove loose dirt prior to placing concrete.

3. Ensure that forms conform to shape, lines and dimensions of members shown on drawings.

4. Minimize and symmetrically align form joints and make watertight to prevent leakage of mortar.

5. Arrange and assemble formwork so that concrete will not be damaged during stripping of forms.

C. Erection:

1. Provide bracing to ensure stability of formwork. Strengthen formwork liable to be overstressed by construction loads.

2. Provide temporary ports in formwork to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain. Close ports with tight fitting panels, flush with inside face of forms, neatly fitted so that joints will not show in exposed concrete surfaces.

3. Do not displace or damage in-place vapor retarder.

4. Construct formwork to maintain tolerances in accord with ACI 301.

D. Form Release Agent:

1. Apply form release agent on formwork in accord with manufacturer's current printed instructions. Apply prior to placing reinforcement, anchoring devices and embedded items.

E. Form Removal:

1. Notify Architect/Engineer 24 hours prior to removing formwork.

2. Do not remove forms and bracing until concrete has sufficient strength to support its own weight, and construction and design loads which may be imposed on it.

F. Cleaning:

1. Clean forms to remove foreign matter as erection proceeds.

2. Ensure that water and debris drain to exterior through clean-out ports.

3. During cold weather, remove ice and snow from forms. Do not use de-icing salts. Do not use water to clean out completed forms, unless formwork and construction proceed within heated enclosure. Use compressed air to remove foreign matter.

G. Form Re-use:

1. Contractor may reuse formwork that is free from defects, cracks or damage caused by previous use.

2. Remove, replace or repair all portions of formwork designated for reuse. Make all repairs using same type of material as originally used. Make all repaired areas smooth and flush.

3.03 REINFORCEMENT BARS

A. Storage and Protection:

1. The reinforcement bars, when delivered on the job, shall be stored above the surface of the ground upon platforms, skids or other supports, and shall be protected from mechanical injury and from deterioration by exposure. When placed in the work, they shall be free from dirt, detrimental scale, paint, oil, or other foreign substances.

B. Cutting and Bending:

1. Reinforcement bars shall be cut and bent at the mill or shop to the shapes shown on the plans before shipment to the work. Bending in the field will not be permitted **except** to

correct errors, damage by handling and shipping, and minor omissions in shop bending.

C. Patching and Securing:

1. All reinforcement bars shall be placed and tied securely at the locations and in the configuration shown on the plans prior to the placement of concrete. Reinforcement bars shall not be placed by sticking or floating into place during or immediately after placement of the concrete.

2. Bars shall be tied at all intersections except where the center to center dimension is less than 300 mm (1 ft.) in each direction, in which case alternate intersections shall be tied. The number of ties as specified shall be doubled for lap splices at the stage construction line of concrete bridge floors when traffic is allowed on the first completed stage during the pouring of the second stage.

3. Prior to the placement of any concrete, all mortar or other foreign material shall be removed from the reinforcement. Placement of the concrete shall not commence until the A/E has inspected and approved the reinforcement placement. The Contractor shall correct any misalignment of the reinforcement bars occurring during the placement of the concrete.

4. The clearances from the face of the form shall be maintained by the use of chairs or other supports approved by the A/E. Clearance from the bottom of footing shall be maintained by concrete blocks, cement bricks, suspended in place, or other supports system approved by the A/E. Pebbles, stones, building bricks, and wood blocks shall not be used for bar supports.

D. Splicing:

1. Reinforcement bars shall be furnished in the full lengths indicated upon the plans. No splicing of bars, except where indicated on the plans, will be permitted without the written approval of the A/E. All reinforcement bars specified along a continuous line of bars shall be lapped the specified length and shall be contact spliced and wired together. All lapping reinforcement bars, not specified along a continuous line and contact spliced, shall be placed a clear distance apart of at lest 65 mm (2½") or contact spliced, whichever requires the least adjustment in the bar spacing specified.

2. Splicing of reinforcement bars by welding will not be allowed.

3.04 ADMIXTURES

A. Air Entrainment: Add air entrainment admixture to achieve specified percentages of air content. Follow admixture manufacturer's current printed instructions.

B. Chemical Admixtures. Use only upon receipt of Architect/Engineer's prior written approval.

3.05 ACCESSORIES

A. Bonding Agent:

1. Prepare previously placed concrete by cleaning with a steel brush.

2. Apply bonding agency in strict accord with manufacturer's current printed instructions.

B. Vapor Retarder:

1. Verify that fill materials are dry and clean, ready to receive the work.
Remove all loose or foreign matter and all protuberances that would puncture or otherwise

damage the membrane.

2. Coordinate the work with progress of work of other crafts affected.

3. Use largest sheet size practicable; minimize seams, laps. Lap a minimum of 4 in. and seal with tape.

4. Follow membrane manufacturer's current printed instructions.

3.06 EXPANSION & CONSTRUCTION JOINTS

A. Preparation: Properly locate and form expansion, control and contraction joints in accord with drawings and approved shop drawings.

B. Installation:

1. Expansion Joints:

a. Install expansion joints at right angles to concrete surface; extend through full depth or thickness of concrete.

b. Cut-back exposed expansion joint material a minimum of 3/8 in. from surface of concrete; fill with sealant flush to surface; tool smooth.

2. Place formed construction joints in floor slab. Set top screed to indicated elevations. Secure to resist movement of wet concrete.

3. Install joint anchorage in accord with manufacturer's current printed instructions. Use primers recommended by joint filler and sealant manufacturer.

4. Apply sealants in accord with 07900.

5. Joints for Concrete Curb and Gutter shall be according to Article 606 of the IDOT Standard Specifications.

3.07 CONCRETE PLACEMENT

A. Preparation:

1. Notify Architect/Engineer at least 24 hours prior to scheduled placements of all concrete. Confirm notification in writing.

a. Prior to placement, Architect/Engineer will inspect all lines, grades, elevations, formwork, reinforcement and accessories.

b. Do not proceed with concrete work without Architect/Engineer's written approval of all items.

2. Ensure that forms are properly coated with form release agent.

3. Ensure that all reinforcement, sleeves, conduits, pipes, frames for openings, anchors, inserts, and other embedded items are in place and properly anchored.

4. Ensure that all reinforcement is clean and free of all material harmful to concrete.

5. Verify proper placement of vapor retarder and perimeter insulation.

B. Placement:

1. Place all concrete in accord with ACI 301.

2. Ensure that in-place items, reinforcement, embedded items, vapor retarder and insulation are not dislodged or displaced during placement.

3. Convey all concrete from mixer to place of deposit as rapidly as possible by means that will prevent segregation or loss of materials.

4. Deposit concrete as nearly as practicable in its final position to avoid segregation due to rehandling or flowing.

   a. Place concrete at the rate that will keep concrete plastic at all times and flowing readily into spaces around reinforcement.

   b. Do not use concrete that has partially hardened or that has been contaminated with foreign materials.

   c. retempering will not be allowed.

   d. Do not allow concrete to free fall more than 4 ft.

   e. Place all concrete on clean, well-thawed, damp surfaces, free from water; never upon soft mud or dry porous earth.

5. Once started, place concrete continuously between predetermined construction and control joints. Continue placing until panel or section is completed; keep top surfaces level. (Do not break or interrupt successive pours so that cold joints occur.)

6. Slabs on Fill:

   a. Place a porous fill over subgrade, consisting of clean washed crushed gravel or crushed limestone graded from 3/4 in. to 1-1/2 inc.; 4 in. thick. Roll or tamp fill until thoroughly compacted.

   b. Install vapor retarder, insulation, reinforcement, embedded items as specified.

   c. Provide wood runways for wheeled equipment for transporting concrete over in-place construction. Prevent dislodgement or damage to in-place items.

   d. Saw cut control joints at an optimum time after finishing. Us 3/16 in. thick blade; cut 1/4 depth of slab thickness.

   e. Separate slabs from vertical surfaces with joint filler. Extend joint filler from bottom of slab to within ½ in. of finished slab surface.

   f. Place concrete of indicated thickness and strike off at proper levels to receive specified finishes.

   g. Set continuous expansion joint strips, seal joint tightly at strips and spaces around pipes, sleeves or conduits penetrating slabs.

   h. See Finish Schedule at end of Section.

   i. Tolerances: Provide Class A tolerances to floor slabs in accord with ACI 301.

7. Concrete Curb and Gutter:

   a. Placement in accordance with article 606 of the IDOT Standard Specifications.

C. Weather Conditions:

1. Place all concrete in accordance with ACI 305R-89 (hot weather placement) and ACI 306-88 (cold weather placement).

2. Concrete temperature when deposited: Minimum 50°F; maximum 85°F.

3. In freezing weather, provide suitable means for maintaining concrete temperature at a minimum of 70°F. for three days, or 50°F. for five days after placing.

4. Cooling of concrete to outside temperature: Not faster than 1° per hour for first day and 2° per hour thereafter until outside temperature is reached.

5. Maximum temperature of concrete produced with heated aggregated, heated water, or both, at any time during its production or transportation: 90°F.

6. Do not mix salt, chemicals or other foreign materials in concrete to prevent freezing or to accelerate hardening of concrete.

3.08 PATCHING

A. Upon completion of each concrete placement, Architect/Engineer will inspect the work, and will order all concrete not formed as shown on drawings or approved shop drawings, or which is out of level or alignment, or which shows defective surfaces, to be removed and replaced with satisfactory work.

1. Upon Contractor's written request, Architect/Engineer may give written authorization to patch specific defective surfaces.

2. The Architect/Engineer's authorization to patch any defective area will not be considered a waiver of the Architect/Engineer's right to order removal and replacement of defective work when patching is not satisfactory.

3. When authorized, perform patching in accord with ACI 301, Ch. 9.

4. At Contractor's option, a bonding agent may be used instead of or in addition to bonding grout, provided the bonding agent does not affect color of concrete. Use bonding agent in accord with manufacturer's current printed instructions. Apply after all cutting, chipping and cleaning of oil, dust, dirt, grease or loose surface materials have been removed.

5. Building up patching to match appearance of surrounding exposed concrete surfaces. Apply bonding agent to honeycombed areas, aggregate pockets or other voids, and fill with motor consisting of Portland cement and aggregate selected to match existing concrete and finish of existing surfaces. Cure patches to prevent cracks.

6. Patching and surfacing compound may be used for thin patches where it is not necessary to match the color, texture and finish of surrounding concrete surfaces.

3.09 DEFECTIVE CONCRETE

A. Modify or replace concrete not conforming to indicated lines and levels, details and elevations.

B. Repair or replace concrete not properly placed or finished, or not of specified type.

3.10 FINISHES

A. Slabs: Provide level slabs except where otherwise indicated on drawings. Determine all top-of-slab elevations by use of preset runners supported by adjustable chairs set to proper elevation. Architect/Engineer will obtain readings by use of surveyor's level to verify elevations of runners and supporting formwork. Schedule the work so that these readings may be obtained before beginning concrete placement and without causing delay in the work.

1. Place concrete for all slabs continuously between construction joints; consolidate by vibration. Bring to correct level with a straight edge and strike off. Use bull floats or darbies to force coarse aggregate down and to produce a smooth surface, free from humps and hollows.

2. Power float all slabs to a texture consistent with the existing tennis courts. Begin power floating when water sheen has disappeared or the mix has stiffened sufficiently that the weight of a man standing on it leaves only a slight imprint on the surface. If two power floating operations are necessary to bring the surface to the specified state, allow the concrete to stiffen or become harder before beginning the second floating operation.

3. Perform additional finishing, including brooming, flushing and steel troweling as specified.

4. When steel trowel finish is specified, provide power and hand troweling. Begin power troweling as soon as little or no cement past clings to the blades. Continue troweling until the surface is dense, smooth and free of all minor blemishes such as trowel marks.

5. Maximum variation in surface tolerance for troweled finishes "B" and "C": 1/8 in. in 10 ft. If variations greater than this exist, the Architect/Engineer may direct the Contractor to grind the surfaces to bring them within the tolerance specified. Patching of low spots will not be permitted. Perform grinding as soon as possible, preferably within three calendar days, but not until the concrete is sufficiently strong to prevent dislodging coarse aggregate particles.

6. Sprinkling of dry cement or a mixture of dry cement and sand on the surface of the fresh concrete to absorb water or to stiffen the mix will not be permitted.

7. Finishes:

   a. Finish "C". (For exposed concrete floors which will remain exposed, receive finished flooring, special coatings, paint, harder or sealer): Finish with a steel trowel. Use final hand troweling to remove slight imperfections left by troweling machines and to bring surface to a dense, smooth polished final finish. Continue hand troweling until a ringing sound is heard as the trowel passes over the surface.

   b. Finish "D" (Interior or exterior ramps, exterior slabs, platforms. sidewalks, curb and gutter, and steps): Trowel to a smooth, dense surface. Finish with a fine-hair push broom, perpendicular to the direction of pedestrian or vehicular traffic. Finish gutter parallel to the direction of water flow.

   c. Exposed aggregate finish shall be constructed as follows:

      1) Materials:

         a) An IDOT approved Class SI concrete mix from an IDOT certified ready-mix plant that incorporates gravel as the coarse aggregate.

      2) Installation:

         a) Install and compact subbase per plan details, place concrete, finish,

spray retarder to 1/8" deep on top, let cure 4 - 24 hours.

b) Hose and brush-off evenly. Let dry and cure for 4 - 6 weeks.

c) Power wash off top surface to remove remaining cement matrix and clean exposed aggregates.

d) Wash off, let dry and spray a sealer approved by the A/E.

3.11 FIELD QUALITY CONTROL - INSPECTIONS & TESTS

A. A/E will make the following inspections and tests in accord with ACI 301.

1. Compression strength test for each 50 cu. yds. of concrete, or fraction thereof, on specimens taken at point of discharge from the truck immediately before placing of each design mix daily. A set of test specimens will consist of four standard 6 in. x 12 in. cylinders in accord with ASTM C172 and ASTM C39. Two cylinders will be tested at seven days, the other two at 28 days. The complete test set will be picked up by the A/E in 24 hours after casting and taken to the A/E's laboratory for further curing and testing.

2. Three additional cylinders will be made during a placement which requires temporary heating. These cylinders will be left in the enclosure in the same environment as concrete placed. One cylinder will be tested at three days, one at seven days, the third at 28 days to verify adequacy of temporary heating system.

3. Slump test will be performed in accord with ASTM C143, with one test made for each 50 cu. yds. of concrete, or fraction thereof.

4. Air entrainment test will be performed in accord with ASTM C173 or C231, with one test made for each 50 cu. yds. of concrete, or fraction thereof.

5. When tests indicate concrete strength below that specified, improper slump or air entrainment, or when visual defects indicate poor quality concrete has been placed, Architect/Engineer will immediately notify Contractor. Contractor may, at its own expense, have additional tests made; including compression tests on cored cylinders in accord with ACI 318. Architect/Engineer will order the removal of all non-conforming or defective concrete, and its replacement with concrete meeting project specifications.

B. The Contractor shall give the Architect/Engineer 48 hours advance notice of placing any concrete. The Architect/Engineer shall make test cylinders, air and slump tests and witness placement of concrete. If the Architect/Engineer is not present to perform or witness the foregoing because of less than 48 hours notice, the Contractor shall hire, at his own expense, an independent testing lab to take and test core samples at locations directed by the Architect/Engineer.

3.12 LIQUID HARDENER AND SEALER

A. Seal interior concrete floors which will remain exposed and make dust-proof by applying one additional coat of curing compound as specified. Make every effort to eliminate staining of concrete during construction.

B. Apply the second coat after completion of construction, at the minimum rate of 1 gal. per 450 sq. ft. Verify that surfaces are thoroughly set, sound, dry, clean and free from dust, dirt, oil or paint. Repair holes and depressions and finish smooth or to match texture of adjacent floor areas. Uniformly apply with spray, roller or soft pushbroom, ensuring that all voids and minor depressions are fully coated.

3.13 ADJUST & CLEAN

A. Upon completion, thoroughly inspect all work. Correct all defects. Remove defective work when patching is not authorized by Architect/Engineer.

B. Clean up and remove all surplus materials, packing, rubbish and debris resulting from the work and legally dispose of off site.

3.14 PROTECTION: Protect finished concrete work so that work will be without flaw or damage at Architect/Engineers's acceptance.

END 03001

1. GENERAL

1.01 WORK INCLUDED

A. Base Bid:

1. General Contractor provide:
   a. Mortar and grout for unit masonry.
   b. Provide mortar and grout in color as selected by architects/engineers at glazed block and glass unit masonry as shown on drawings.

1.02 RELATED WORK

A. Specified elsewhere:

1. 04200 - Unit Masonry
2. 05120 - Structural Steel

1.03 REFERENCES

A. ASTM C94 - Ready-Mixed Concrete.
B. ASTM C144 - Aggregate for Masonry Mortar.
C. ASTM C150 - Portland Cement.
D. ASTM C207 - Hydrated Lime for Masonry Purposes.
E. ASTM C270 - Mortar for Unit Masonry.
F. ASTM C387 - Packaged, Dry, Combined Materials for Mortar and Concrete.
G. ASTM C476 - Grout for Reinforced and Non-reinforced Masonry.
H. ASTM C780 - Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
I. International Masonry Industry All-Weather Council (IMIAC) - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

1.04 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 50 degrees F prior to, during, and 48 hours after completion of masonry work. If environmental conditions do not allow this, follow 'B' below for cold weather. In hot weather (above 99 degrees F with less than 50% relative humidity) protect masonry construction from direct exposure to sun and wind.
B. Cold Weather Requirements: IMIAC - Recommended Practices and Specifications for Cold Weather Masonry Construction.

1.05 PROTECTION

A. Store mortar materials on dunnage in a dry place. During freezing weather, protect masonry units with tarpaulins or other suitable material. Protect reinforcement and accessories from elements.

1.06 SUBMITTALS

A. In accord with 01300.
B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
   1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109 for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
   2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirements.

2. PRODUCTS

2.01 MORTAR

A. Acceptable Manufacturers

1. General Portland.
2. Gifford Hill.
3. Holnam Rainbow Products
4. Substitutions: Under provisions of Section 01600.

2.02 MATERIALS

1. Portland Cement: ASTM C150, normal-Type I; gray color.
2. Mortar Aggregate: ASTM C144, standard masonry type; clean, dry, protected against dampness, freezing, and foreign matter.
3. Grout Course Aggregate: Maximum 3/8 inch size.
4. Grout Fine Aggregate: Standard masonry type sand.
5. Hydrated Lime: ASTM C207, Type S.
6. Premix Mortar: ASTM C387, using gray cement.
7. Water: Clean and potable.

2.03 MORTAR COLOR

A. Selected by A/E from manufacturer's standard full range color selection.

2.04 MIXES

A. Mortar for Non-load Bearing Walls and Partitions: ASTM C270, Type S unreinforced below grade and Type N above grade.

B. Pointing Mortar: ASTM C270, Type N with maximum 2 percent ammonium stearate or calcium stearate per cement weight.

2.05 MORTAR MIXING

A. Thoroughly mix mortar ingredients in quantities needed for immediate use in accordance with ASTM C270 and C476. Measure materials by volume or equivalent weight. Dry batch materials for 3 - 5 minutes before adding water. Only add as much water as necessary to produce workable consistency.

B. Add mortar color in accordance with manufacturer's instructions. Provide uniformity of mix and coloration.

C. Do not use antifreeze compounds to lower the freezing point of mortar or grout.

D. If water is lost by evaporation, do not retemper. Do not use mortar or grout after it has begun initial set.

2.06 GROUT MIXING:

A. Mix grout thoroughly in a mechanical batch mixer according to ASTM C 476 procedures. Grout may be premixed and delivered per ASTM C 94. Use only enough water to produce a workable consistency.

B. Admixtures: Do not use admixtures except as specifically allowed by the A/E.

2.07. RE-TEMPERING:

A. Partially hardened mortar may be re-tempered to replace water lost through evaporation.
B. Do not retemper mortars out of mixer for more than 2 ½ hours.
C. Repointing mortar shall be used within 30 minutes of final mixing. Do not re-temper or use partially hardened repointing mix.

3. EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.
B. Verify items provided by other sections of work are properly sized and located.
C. Beginning of installation means installer accepts existing conditions.

3.02 INSTALLATION

A. Install mortar and grout in accordance with ASTM C 404.
B. Work grout into cores and cavaties to eliminate voids.
C. Do not displace reinforcing steel when placing grout.

3.03 GROUTED COMPONENTS

A. Reinforce bond beams as shown on drawings.
B. Lap spices minimum 24 bar diameters.
C. Place and consolidate grout fill without disturbing reinforcing.
D. At bearing points, fill masonry cores with grout minimum 12" from opening.
E. Grout hollow metal frames with joint around frame uniform at 1/4 inch width.

3.04 GROUTING:

A. Low-Lift Grouting:
   1. Keep grout core clean from mortar and drippings.
   2. Grout spaces less than 2 inches in width at intervals of not more than 24 inches in lifts of 6 to 8 inches as the wall is built.
   3. In grout spaces more than 2 brick in thickness:
      a. Place or float brick in grout.
      b. Minimum grout between brick: 3/8 in.
   4. Agitate or puddle grout during and after placement to insure complete filling.
   5. Stop grout 1/2 in. below top of masonry if grouting is stopped for 1 hr. or more, except when completing grouting of finished wall.

B. High-Lift Grouting
   1. For running bond, provide one metal tie for each 3 sq. ft. of wall with maximum spacing: Vertically: 16 inches; Horizontally: 24 inches.
   2. Keep grout core clean from mortar and droppings.
   3. Provide cleanout holes by omitting every other brick in bottom course on one side of wall.
   4. Prior to closing cleanout holes and pouring grout, use high-pressure jet stream of water or high-pressure air to remove excess mortar from grout space and to clean reinforcement.
   5. Do not plug cleanout holes until condition of area to be grouted has been approved.
   6. Before pouring grout, plug cleanout holes with masonry units and brace against grout pressure.
   7. Grout spaces 2 in. or more in width in lifts not exceeding 4 ft. at intervals:
      a. Coarse grout: Not more than 48 times the least clear dimension of grout space.
      b. Not to exceed height of 12 ft.
   8. Do not place grout until the entire wall has been in place 3 days.
   9. Vibrate or agitate grout during, and after placement to insure complete filling of grout space.
   10. Stop grout 1 1/2 in. below top of masonry if grouting is stopped for 1 hr. or more., except when completing grouting of finished wall.
   11. Provide grout blocks at convenient intervals to meet project requirements.

3.05 TOLERANCES

A.	Maximum variation from unit to adjacent unit:	1/32".
B.	Maximum variation from plane of wall:	1/4" in 10' & ½" in 20' or more.
C.	Maximum variation from plumb:	1/4" per story, noncumulative.
D.	Maximum variation from level coursing:	1/8" in 3' & 1/4" in 10" and ½" in 30'.
E.	Maximum variation in joint thickness:	1/8" in 3'.

F. Maximum variation in cross sectional thickness: 1/4".

3.06 MORTAR JOINT FINISHING

A. Flush Joints: On masonry walls to receive finished tile work, after cutting joints flush, lightly rake joints to avoid bulging of mortar as wall construction progresses and rub joint smooth.

B. Tooled Joints: Tool **all** interior joints either exposed or considered concealed.
1. At time of laying, strike masonry joints flush.
2. When mortar in joints become thumbprint hard, tool to a hard, concave finish using sled type jointer, with diameter 1/8" to 1/4" larger than joint.
3. Jointing tools shall be same diameter for each type of masonry.

3.07 CLEANING:

A. Cut out any defective joints and holes in exposed masonry and repoint with mortar.
B. After mortar has fully hardened thoroughly, clean exposed masonry surfaces of excess mortar and foreign matter using stiff nylon or bristle brushes and clean water, spray applied at low pressure.
C. Clean masonry with the least aggressive cleaning solution and technique possible.
D. Comply with cleaning procedure and recommendations of the manufacturers of both the cleaning solution and the unit masonry.
E. Use of metal scrapers or brushes will not be permitted.

3.08 PROTECTION OF FINISHED WORK

A. Protect finished installation.
B. Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities.

END 04100

1. GENERAL

1.01 WORK INCLUDED

A. Base Bid:

1. General Contractor provide:
   a. Concrete masonry units.
   b. Reinforcement, anchorages, and accessories.
   c. Form control joints
   d. Cut and fit for other trades
   e. Loose steel angles, including any openings for duct work and other mechanical equipement.

1.02 RELATED WORK

A. Specified elsewhere:

1. 04100 - Mortar

1.03 REFERENCES

A. ASTM A153 - Zinc-Coated Wire for Wall Reinforcement.
B. ASTM 90 - Hollow Load bearing Concrete Masonry Units.
C. ASTM C145 - Solid Loadbearing Concrete Masonry Units.
D. ASTM E514 - Test for Water Permeance of Masonry.
E. International Masonry Industry All-Weather Council (IMIAC) - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

1.04 QUALITY ASSURANCE.

A. Installer: Masonry contractor shall have at least 5 years experience in similar types of work and be able to furnish a list of previous jobs and reference if requested by the Architect.
B. Expansion Joints: Provide expansion joints as shown on the Drawings or if not shown, install as recommended by the Brick Institute of America.

1.05 ENVIRONMENTAL REQUIREMENTS.

A. Maintain materials and surrounding air temperature to minimum 50 degrees F prior to, during, and 48 hours after completion of masonry work. If environmental conditions do not allow this, follow 'B' below for cold weather. In hot weather (above 99 degrees F with less than 50% relative humidity) protect masonry construction from direct exposure to sun and wind.
B. Cold Weather Requirements: IMIAC - Recommended Practices and Specifications for Cold Weather Masonry Construction.

1.06 PROTECTION

A. During freezing weather, protect masonry units with tarpaulins or other suitable material. Protect reinforcement and accessories from elements.

1.07 SUBMITTALS

A. In accord with 01300.
B. Product Data: Manufacturer's data sheets on each product to be used:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
C. Submit chart of full range of manufacturer's standard color selection. For preliminary color selection, submit three full size units of each type/color of exposed architectural concrete masonry unit for review of color and texture to verify compliance with products specified. Provide the maximum color and texture variation range expected in the finished work. Production orders may be released after

submittals are approved.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver architectural concrete masonry units to the job site on wood pallets with manufacturer's recommended unit protective covers.
B. Inspect architectural concrete masonry units upon delivery to ensure color match with required materials and accepted samples.
C. Stack masonry units in a dry place off the ground on pallets or a prepared plank platform. Method of stacking is acceptable. Protect with non-staining waterproof tarpaulin coverings arranged to allow air circulation around and above masonry units.
D. Exercise care in the storage, handling and installation of masonry units. Do not build soiled or damaged masonry units into the work.

1.09 NOTE

A. The drawings use both the terms "CMU" and "Concrete Blocks"; both of these terms refer to the same product.

2. PRODUCTS

2.01 CONCRETE MASONRY

A. Smooth Faced Concrete Blocks: ASTM 55 Hollow Core Loadbearing, Grade N, Type 1; Modular Size.
B. Split-faced Concrete Blocks: ASTM 55, nominal face dimensions of 8" x 16" , 8" thick.
C. Unit Weight:
    1. Lightweight Units
D. Integral Water Repellent Units: All exterior wall architectural concrete masonry units including single wythe walls and facing units shall be manufactured using the manufacturer's integral polymeric water repellent admixture.
    1. Performance Requirements:
        a. Water resistance: ASTM E 514
        b. Flexural Bond Strength: Pass for full wall; ASTM E 72
        c. Fully dispersible in water.
E. Color:
    1. As selected by Architect from manufacturer's standard colors.
        a. Color Pigments: Lightfast, alkali-resistant, weather-resistant natural or synthetic iron oxides manufactured specifically for us in concrete masonry units.

2.02 REINFORCEMENT AND ANCHORAGES

A. Acceptable Manufacturers. Use only the specified products of the following manufacturers:
    1. AA Wire Products Company
    2. Dur-O-Wall, Inc.
    3. Heckman Building Products, Inc.
    4. Hohmann & Barnard, Inc.
    5. Masonry Reinforcing Corporation of America
    6. National Ty-Wal Masonry Products
B. Reinforcing Steel
    1. ASTM A615, grade 60, deformed billet-steel bars, uncoated.
C. Single Wythe Joint Reinforcement: Truss type; galvanized steel construction; 3/16 inch side rods with 9 ga. cross ties; width slightly less than block width; Use prefabricated outside corners.
    1. AA Wire Products - "Blok-Truss AA600"
    2. Dur-O-Wall - "Truss"
    3. Hohmann & Barnard - "Truss-Mesh 120

2.03 CONCEALED FLASHINGS

A. Flashing for In-Wall and Thru-Wall Conditions: 40 mil rubberized asphalt membrane, faced with cross-laminated polyethylene film 8 mil thick on one side. Use one of th following:
    1. W.R. Grace - "Perm-A-Barrier"

2. Mirafi - “Miradri TWF”
3. Nevastral - “Bitu-Rap”
4. Polyguard - “400 Flashing”
5. Dur-O-Wal “Dur-O-Barrier DA 1544"
6. Carlisle - “CCW-705-TWF”

B. Surface Primer: Flashing membrane manufacturer’s recommended surface conditioner.
C. Mastic Sealant: Flashing membrane manufacturer’s recommended mastic sealant for repairing membrane and sealing edges, joints, and punctures.
D. Metal Drip: Stainless steel sheet metal drip fabricated with hemmed drip edge, equal to “Partial Edge” by Dur-O-Wal or “Drip Edge” by Polyguard.
E. Setting Mastic for Drip Edge: Same mastic as used for repair of flashing membrane.
F. Support for Membrane Flashing: Where cavity width exceeds 2", provide shop fabricated galvanized metal sheet in configuration to bridge the cavity.

2.04 ACCESSORIES

A. Weep/Cell Vents: Polypropylene plastic, Color as selected by A/E., Size: 2 1/2" x 3 5/8" x 3/8". “Cell Vent” by Sandell Mfg. or comparable product as approved by A/E.
B. Mortar Net: High density polyethylene or nylon strands woven into 90% open mesh.
C. Insulation Plates: DA 2100 (or approved equal). Provide plates to hold rigid insulation against back-up masonry.
D. Control Joints: Preformed rubber material; Blok-Tite and Titewall manufactured by AA Wire Products.
E. Joint Filler: Close cell polyurethane oversized 50 percent; self-expanding; Will-Seal manufactured by AA Wire Products.
F. Joint Sealant: Backing rod and sealant, see 07900.
G. Building Paper: Asphalt saturated felt, 15#.

2.05 CLEANING AGENTS

A. Consult the brick manufacturer for recommendation on what cleaning agent is acceptable for use and the recommended cleaning procedures. Use only manufacturer recommended methods and materials. Use cleaning agents in strict conformance with cleaning agent manufacturer’s instructions.

3. EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.
B. Verify items provided by other sections of work are properly sized and located.
C. Verify that built-in work items are in proper location, and ready for roughing into masonry work.
D. Beginning of installation means installer accepts existing conditions.

3.02 PREPARATION

A. Verify items provided by other Sections of work are properly sized and located.
B. Establish lines, levels, and coursing. Protect from disturbance.
C. Provide temporary bracing during erection of masonry work. Maintain in place until building structure provides permanent bracing.
D. Scaffolding: Provide, erect, maintain, move, and finally remove scaffolding and staging required for masonry installation. Construct and maintain scaffolding in compliance with applicable ordinances, laws, rules, and regulations. Scaffolding shall be sufficiently substantial to support workmen and necessary materials and equipment. Provide adequate guard rails for protection of property, workmen, and passersby.

3.03 COURSING

A. Establish lines, levels, and coursing indicated. Protect form displacement.
B. Maintain masonry courses to uniform dimensions. Form vertical and horizontal joints to uniform thickness.
C. Maintain masonry courses to uniform width of 3/8 inches. Make vertical and horizontal joints equal,

of uniform thickness, tightly tucked.

D. Lay concrete block in running bond. Form concave mortar joints.

3.04 PLACING AND BONDING

A. Lay masonry in full bed of mortar, properly jointed with other work. Buttering corners joints and deep or excessive furrowing of mortar joints are not permitted.
B. Fully bond intersections, and external and internal corners.
C. Do not shift or tap masonry units after mortar has taken initial set. Where adjustment must be made, remove mortar and replace.
D. Remove excess mortar on surface and in cavities.
E. Perform job site saw cutting with proper tools to provide straight unchipped edges. Take care to prevent breaking masonry unit corners or edges.
F. Cut mortar joints of block units flush where resilient base is scheduled, cavity insulation vapor barrier adhesive is applied or bitumen dampproofing is applied.
G. Isolate masonry partitions form vertical structural framing members with a control joint.

3.05 TOLERANCES

A. Variation from Unit to Adjacent Unit: 1/32 inch maximum.
B. Variation from Plane of Wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.
C. Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
D. Variation from Level Coursing: 1/8 inch in 3 feet; 1/4 inch in 10 feet; 1/2 inch maximum.
E. Variation of Joint Thickness: 1/8 inch in 3 feet;
F. Maximum Variation from Cross Sectional Thickness of Walls: Plus or Minus 1/4 inch.

3.06 WEEPS/CELL VENTS

A. Install weep vents in exterior veneer at a maximum of 16 inches on center horizontally above through-wall flashing, above shelf angles, and at bottom of walls.

3.07 REINFORCEMENT AND ANCHORAGES

A. Install horizontal joint reinforcement 16 inches o.c. typically.
B. Lap joint reinforcement ends minimum 6 inches.
C. Place reinforcing bars supported and secured against displacement. Maintain position within 1/2 inch of true dimension.
D. Attach wall ties to wall studs for veneer construction at maximum 16 inches o.c. vertically and 24 inches o.c. horizontally. Place at maximum 3 inches o.c. each way around perimeter of openings, within 12 inches of openings.
E. Reinforce joint corners and intersections with strap anchors 8 inches o.c.

3.08 LINTELS

A. Support opening over 12" wide with loose steel lintels. Where a control joint is shown to cross the end of lintel, install flashing material over and under the end of the lintel and leave a space for expansion movement at the end of the lintel.
B. Install loose steel lintels as scheduled or shown.
C. Lintels for miscellaneous openings not shown on the Drawings shall be furnished by the trade requiring the openings.

3.09 GROUTED COMPONENTS

A. Reinforce bond beams as shown on drawings.
B. Lap spices minimum 24 bar diameters.
C. Place and consolidate grout fill without disturbing reinforcing.
D. At bearing points, fill masonry cores with grout minimum 12" from opening.
E. Grout hollow metal frames with joint around frame uniform at 1/4 inch width.

3.10 CONTROL EXPANSION JOINTS

A. Do not continue horizontal joint reinforcing across control joints.
B. Install resilient control joint in continuous lengths. Solvent weld butt and corner joints in accordance with manufacturer's instructions.
C. Size control joints in accordance with Section 07900 for sealant performance, but in no case larger than adjacent mortar joints in exposed face brick.
D. Provide expansion joints where shown on the Drawings or as required/recommended by reference standards.

3.11 BUILT-IN WORK

A. As work progresses, built-in metal door frames, fabricated metal frames, window frames, wood nailing strips, anchor bolts, plates, and other items to be built in the work supplied by other Sections.
B. Built-in items plumb and level.
C. Bed anchors of metal door and glazed frames in mortar joints. Fill frame voids solid with mortar. Fill masonry cores with grout minimum 12 inches from framed openings.
D. Do not use built-in organic materials subject to deterioration.
E. Sleeves for Pipes, Conduits, Etc.: Mortar the sleeves solidly in place, accurately fit to the alignments required by other trades. Extend sleeves 1 1/2" beyond each face of wall or partition.
F. Duct Openings and Other Openings for Mechanical Work: Construct openings as required by mechanical trades, providing no more than 2" clearance around ducts.

3.12 MASONRY FLASHING

A. Locations: Install thru-wall flashings at the following masonry locations, whether shown or not:
    1. At base of exterior masonry walls.
    2. Over all exterior lintels.
    3. Over all exterior shelf angles.
B. Thru-Wall Flashing Fabrication: Form typical thru wall flashing by adhering self-adhesive flashing membrane to a stainless steel edge drip, adhering membrane all across the top of the sheet metal. Trim membrane at edge of metal drip.
    1. Install the metal drip edge to make continuous runs. Lap the metal joints and fill with mastic used to set the edge drip. Trim the metal length to match the width of the flashing.
C. Thru-Wall Flashing Installation
    1. Comply with the flashing membrane manufacturer's temperature limitations.
    2. Install in one piece to the extent practicable. Lap flashing 6" at joints and seal joint edges continuously.
    3. Lintel Flashing: Extend flashing past ends of lintel and fold flashing up into the first head joints beyond end of lintel to form a positive end dam.
    4. Step Flashing: At the end of each section of flashing, fold flashing at least 1" up into a head joint so as to form a positive end dam.
    5. Vertical leg of flashing shall be anchored with a continuous termination bar.

3.13 CUTTING AND FITTING

A. Cut and fit for chases, pipes, conduit, sleeves, and grounds. Cooperate with other sections of work to provide correct size, shape, and location.
B. Obtain A/E approval prior to cutting or fitting any area not indicated or where appearance or strength of masonry work my be impacted.

3.14 CLEANING

A. Cut out any defective joints and holes in exposed masonry and repoint with mortar.
B. Clean all exposed unglazed masonry:
    1. Apply cleaning agent to sample wall area of 20 sq. ft in location acceptable to the A/E.
    2. Do not proceed with cleaning until sample area is approved by A/E.
    3. Clean initially with stiff brushes and water.
    4. When cleaning agent is required:
        a. Follow brick manufacturer's recommendations.
        b. Thoroughly wet surface of masonry on which no green efflorescence appears.
        c. Scrub with acceptable cleaning agent.

d. Immediately rinse with clear water.
e. Do small sections at a time.
f. Work from top to bottom.
g. Protect all sash, metal lintels, and other corrodible parts when masonry is cleaned with acid solution.
h. Remove efflorescence in accordance with brick manufacturer's recommendations.

3.15 PROTECTION

A. Protect finished installation.
B. Maintain protective boards at exposed external corners which may be damaged by construction activities.
C. Provide protection without damaging completed work.
D. At day's end, cover unfinished walls to prevent moisture infiltration.
E. Touch-up, repair, or replace damaged products before Substantial Completion.

END 04200

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide:
1. All miscellaneous iron and steel items not specifically described in other Sections of these Specifications but required for a complete and operable facility; including but not limited to lintels, closures, sill angles, structural steel, railings, etc.

1.02 QUALITY ASSURANCE:

A. Qualifications of welders: Use only certified welders and the shielded arc process for all welding performed in connection with the work of this Section.

B. Codes and standards: In addition to complying with all pertinent codes and regulations, comply with:

1. "Specification for Design, Fabrication, and Erection of Structural Steel for Buildings" of the American Institute of Steel Construction.
2. "Code for Welding in Building Construction" of the American Welding Society.

C. Conflicting requirements: In the event of conflict between pertinent codes and regulations and the requirements of the referenced standards or these Specifications, notify the Architect/Engineer in writing and request instructions.

1.03 SUBMITTALS

A. Provide product data and shop drawings.

2. PRODUCTS

2.01 STEEL TUBING: Steel tubing shall be new, free from rust, & conforming to requirements of ASTM A-501.

2.02 STEEL PLATE: Shall be new, free from rust, and conforming with the requirements of ASTM A-36.

2.03 LINTELS: All steel lintels shall be new, free from rust and conforming to the requirements of ASTM A-36. ***All lintels exposed to the exterior shall be galvanized***, conforming to the requirements of ASTM A653.

2.04 BOLTS AND NUTS: All bolts and nuts shall be new, free from rust, and conforming with the requirements of ASTM A307.

2.05 ELECTRODES: All arc welding electrodes used shall be only those specifically recommended for the purpose by the American Welding Society.

2.06 PRIMER PAINT: All primer paint shall be compatible with the finish coats specified in Section 09900 of these Specifications. Primer shall be: Glidden's - Glid-Guard Rustmaster; Pratt & Lambert's - P & L Noxide; Sherwin Williams - Kem Kromex metal primer.

2.07 OTHER MATERIALS: All other materials not specifically described but required for a complete and proper installation of miscellaneous metal, shall be new, free from rust, best quality of their respective kinds, and subject to the approval of the Architect/Engineer.

3. EXECUTION

3.01 SURFACE CONDITIONS

A. Inspection:

1. Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where fabrication and installation of the work

of this Section may properly commence.

2. Make all required measurements in the field to ensure proper and adequate fit of miscellaneous metal items.
3. Verify that miscellaneous metal may be fabricated and installed in strict accordance with the original design and the approved Shop Drawings.

B. Discrepancies:
1. In the event of discrepancy, immediately notify the Architect/Engineer.
2. Do not proceed with fabrication or installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.02 FABRICATION

A. Compliance: Fabricate all miscellaneous metal in strict accordance with the approved Shop Drawings and the referenced standards.

B. Prefabrication: Insofar as possible, shop prefabricate all items complete and ready for installation.

C. Welding:
1. Unless otherwise indicated on the Drawings, weld all shop connections.
2. make all joints and intersections of metal tightly fitting and securely fastened.
3. Make all work square, plumb, straight, and true.

D. Holes:
1. Drill or punch all holes required for the attachment of work of other trades and for bolted connections.
2. Burned holes are not acceptable.

3.03 SHOP PAINTING

A. Preparation:
1. Thoroughly clean all metal as described in Section 09900.
2. Provide all required protection for metal to be encased in concrete to prevent accumulation of deleterious foreign material.

B. Painting: Shop prime all steel except:
1. Steel to be encased in concrete.
2. Surfaces to be welded.
3. Contact surfaces to be high strength bolted; and

3.04 ERECTION

A. Coordination: Coordinate installation schedule with the schedules of other Contractors to ensure orderly and timely progress of the total work.

B. Compliance: Erect and install all miscellaneous metal in strict accordance with the Drawings, the approved Shop Drawings, and the referenced standards, aligning straight, plumb, and level within a tolerance of one in 200.

C. Touching up: After the erection and installation are complete, touch-up all shop priming coats damaged during transportation and erection, using the priming paint specified for shop priming.

END 05500

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide all rough carpentry, including miscellaneous items normally provided by carpentry trade, including but not limited to the following:
   1. Exterior sheathing.
   2. Wood nailers, plates, blocking, furring, grounds, etc.
   3. Rough hardware including bolts, nuts, washers, nails, spikes, etc.
   4. Wood blocking and supports in conjunction with installation of grab bars, toilet accessories and other miscellaneous specialties.

1.02 QUALITY ASSURANCE

A. Lumber grading rules and wood species to conform with Voluntary Product Standard PS 20-70; Grading rules of the following associations apply to materials furnished under this section.
   1. Northeastern Lumber Manufacturer's Association, Inc. (NELMA).
   2. Southern Pine Inspection Bureau (SPIB).
   3. West Coast Lumber Inspection Bureau (WCLIB).
   4. Western Wood Products Association (WWPA).
   5. Northern Hardwood and Pine Manufacturer's Association (NHPMA).

B. Plywood and OSB grading rules:
   1. Softwood Plywood - Construction and Industrial: Product Standard PS1-66.
   2. American Plywood Association Performance Rating Standard PRP 108.

C. Grade Marks: Identify all lumber and plywood by official grade marks:
   1. Lumber: Grade stamp to contain symbol of grading agency, mill number or name, grade of lumber, species or species grouping or combination designation, rules under which graded, where applicable and condition of seasoning at time of manufacture.
      a. S-GRN: Unseasoned.
      b. S-DRY: Maximum 19% moisture content.
      c. MC-15 or KD: Maximum of 15% moisture content.
      d. Dense.
   2. Preservative Treatment of lumber shall be treated according to appropriate AWPA Standards. Each piece of treated material shall bear an identification stamp or end tag which includes the name of the inspection agency, product class, and preservative.
   3. Softwood Plywood & OSB: Appropriate grade trademark of the American Plywood Association.
      a. Type, grade, class and identification index.
      b. Inspection and testing agency mark.

1.03 WORKMANSHIP QUALITY

A. Workmanship for rough carpentry shall be in accordance with requirements of National Lumber Manufacturers Association.
   1. Cut members square on bearings and fit closely.
   2. Set accurately to lines and levels and plumb.
   3. Secure rigidly in place at bearings and connections.
   4. Use bolts and strap iron where required for best possible results.
   5. Use metal framing anchors where needed to strengthen structure and to anchor against wind uplift.

2. PRODUCTS

2.01 LUMBER

A. Dimensions:
1. Specified lumber dimensions are nominal.
2. Actual dimensions conform to industry standards established by American Lumber Standards Committee and rules writing agencies.

B. Moisture Content: Kiln dried to 15% maximum at time of installation for framing and decking.

C. Surfacing: Surface four side (S4S) unless specified otherwise.

D. Framing lumber, 2" to 4" thick, 2" to 12" wide, any commercial softwood species:
1. General Framing: Stud grade of standard and better.
2. Plates, blocking, bracing, bulk headings, nailers, and general utility purposes: Utility grade.
3. Economy grade shall not be used.

2.02 EXTERIOR WALL SHEATHING

A. Size: ½ or 5/8 inch thick (see drawings) x 4 feet wide x 8, 9 or 10 feet long.
B. Composition: gypsum sheathing manufactured in accordance with ASTM C 1177 with glass mats both sides and long edges, water-resistant treated core.

2.03 Rough Hardware:

A. Nails, Spikes and Staples: Hot-dipped galvanized stainless steel or aluminum for exterior locations and high humidity locations; plain finish for other interior locations; size and type to suit application; staples shall not be used for fastening wood structurally.
B. Bolts, Nuts, Washers, Lags, Pins, and Screws: Medium carbon steel; sized to suit application; galvanized for exterior locations, high humidity locations, plain finish for other interior locations.
C. Fasteners: Toggle bolt type for anchorage to hollow masonry and expansion shield and lag bolt type for anchorage to solid masonry or concrete.
D. Bar or Strap Anchors: ASTM A525 zinc-coated steel, 16 gauge minimum.
E. Framing Anchors: Minimum of 18 gauge zinc-coated steel, size and configuration determined by type of connection required.

3. EXECUTION

3.01 INSTALLATION - GENERAL

A. Blocking and all other carpentry items shall be laid out as called for by drawings or required by the nature of the work and shall be cut and fitted as necessitated by conditions encountered. All work shall be plumbed, leveled and braced with sufficient nails, spikes, bolts, etc., to ensure rigidity.

B. All pieces of wood or other carpentry material with a defect or defects that prevent it from serving its intended purposes satisfactorily, including crooked, warped, bowed, or otherwise defective material, even if within the limits of grade specified, will be rejected and shall be replaced with an acceptable piece. Blocking used as reveals as detailed on drawings shall be free of exposed knots.

C. Wood furring, including blocking and stripping necessary to maintain lines of and support finishes shown on the drawings shall be provided.
1. Wood furring shall be provided to receive trim at windows and other openings in outside walls.
2. Wood blocking, nailers and grounds shall be provided to receive engaging woodwork,

cabinets, grab bars, toilet partitions, toilet accessories and/or other finished items.

3. Wood furring, blocking, stripping, nailers, grounds, called for by drawings or necessitated by conditions, shall be secured in place with approved types and sizes of nails, ties, bolts, inserts, spaced to provide secure and rigid support.

D. Verify that surfaces to receive rough carpentry materials are prepared to exact grades and dimensions. Application or installation of materials constitutes acceptance of existing conditions.

E. Frame wood members to a close fit, set accurately to required lines and levels and secure rigidly in place in accordance with details. Cut and fit framing, blocking, and furring to accommodate other work as required.

3.02 INSTALLATION OF EXTERIOR SHEATHING / DECKING

A. Place sheathing with end joints staggered.

B. Secure ends of sheets over firm bearing; maintain minimum of 1/16" and 1/8" spacing between joints of sheets.

C. Place the long dimension of sheathing sheets perpendicular to framing members.

D. Secure to framing members using screws at 6" o.c. along the sheet edges and 12" o.c. in the field of the sheet.

3.03 ROOF BLOCKING

A. Furnish and install all wood roof blocking and nailers required by drawings.

B. Blocking shall be sizes and shapes indicated on details and as required by conditions encountered.

3.05 ROUGH HARDWARE

A. Rough hardware needed for proper installation of all carpentry and millwork shall be provided.

B. Nails, spikes, screws, bolts and similar items shall be of proper types and ample sizes to fasten and hold various members securely in place.

3.06 ADJUST AND CLEAN

A. Remove from site all rubbish, debris and packaging produced by operations and leave site in a "broom clean" condition.

B. Adjust all working items to fit snugly yet work freely.

3.07 PROTECTION

A. All carpentry items subject to damage during construction or affected by weather shall be properly protected.

B. Protect completed work from damage until project is completed and accepted.

END 06100

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide finish carpentry work shown on the drawings and specified herein including:
1. Cabinets, counters and other casework (also see Section 12300; Manufactured Casework).
2. Shelves, including brackets, standards and other miscellaneous hardware.
3. Vanity counters.
4. Miscellaneous trim.
5. All hardware needed for proper installation of work.
6. Installation of work of other sections, including but not necessarily limited to doors and specialties.
7. Power circuits, data wiring, and terminations in table top benches and cabinetry as noted or shown on plans.

1.02 QUALITY ASSURANCE

A. Lumber grading rules and wood species shall conform with Voluntary Product Standards PS 20-70: Grading rules of the following associations apply to materials furnished.

1. Northeastern Lumber Manufacturer's Association, Inc. (NELMA).
2. Southern Pine Inspection Bureau (SPIB).
3. West Coast Lumber Inspection Bureau (WCLIB).
4. Western Wood Products Association (WWPA).
5. Redwood Inspection Service (RIS).
6. Northern Hardwood and Pine Manufacturer's Association (NHPMA).

B. Plywood Grading Rules:

1. Softwood Plywood - Construction and Industrial: Product Standard PS 1/ANSI A199.1.
2. Hardwood Plywood: Product Standard PS 51.

C. Grade Marks: Identify all lumber and plywood by official grade mark:

1. Lumber: Grade stamp to contain symbol of grading agency, mill number or name, grade of lumber, species or species grouping or combination designation, rules under which graded, where applicable, and condition of seasoning at time of manufacture.
   a. S-GRN: Unseasoned.
   b. S-DRY: Maximum 19% moisture content.
   c. MC-15 or KD: Maximum of 15% moisture content.
   d. Dense.
2. Softwood Plywood: Appropriate grade mark of the American Plywood Association.
3. Hardwood Plywood: Appropriate grade mark of qualified inspection, testing or grading agency.

D. Quality Standards of Architectural Woodwork Institute (AWI) shall apply and by reference are hereby made a part of this Specification.

1. Any reference to Premium, Custom or Economy, in this Specification shall be defined in 1984 edition of AWI "Quality Standards".
2. Any item not given a specific quality grade in this Specification shall be Custom Grade as defined in AWI "Quality Standards".

E. Woodwork manufacturer must have a reputation for doing satisfactory work on time and shall have successfully completed comparable work.

1. Regularly and actively engaged in manufacture of this type of work for a period of 10 years.
2. Woodwork manufacturer shall, in addition have fabricated and installed work of a similar character and magnitude, and which has been in satisfactory use for a least 7 years.

F. Woodwork manufacturer shall be responsible for all details and dimensions not controlled by job conditions and shall show on his shop drawings all required field measurements beyond his control.

G. Contractor and woodwork manufacturer shall cooperate to establish and maintain field dimensions.

1.03 SUBMITTALS

A. In accord with 01300:

1. Shop drawings: service window counter, window sills, counter tops.
2. Samples: Set of plastic laminate samples for color and texture selection.
3. Samples: Set of solid plastic samples for color and texture selection.

2. PRODUCTS

2.01 PLASTIC LAMINATE COUNTERS AND CABINETS

A. Counters shall conform to drawings, details, and AWI Section 400B Custom Grade requirements for plastic laminate clad cabinets.

B. Plastic laminate colors and patterns as selected by Architect/Engineer from samples submitted by Contractor.

C. Solid plastic colors and patterns as selected by Architect/Engineer from samples submitted by Contractor.

2.02 PARTICLE BOARD

A. Conform to ANSI A208.1 Grade 1-M-1.

B. All particle board shall be medium density panels of 37 to 50 pounds per cubic foot.

C. All particle board shall be in thickness as detailed on drawings.

D. Provide solid hardwood edging if used as veneer core material for finish panels; match grain.

2.03 PLASTIC LAMINATE OVERLAY

A. Plastic laminate shall be a decorative laminate, 0.060" thickness with 60" impact resistance.

B. Acceptable Manufacturers:

1. Formica Corporation, P. O. Box 338, Piscataway, NJ; 201/469-1555.
2. Wilsonart, Ralph Wilson Plastics Company, 600 General Bruce Drive, Temple TX; 910/890-5880.
3. Pionite, Laminated Products Group, 1715 Indian Wood Circle, Maumee, OH 43537; 419/891-2500.

2.04 ROUGH HARDWARE

A. Rough hardware needed for proper installation of all carpentry and millwork shall be provided.

B. Nails, spikes, screws, bolts and similar items shall be of proper types and ample sizes to fasten and hold various members securely in place.

C. Bolts: FS FF-B-584.

D. Nuts: FS FF-N-836.

E. Expansion Shields: FS FF-B-561.

F. Lag Screws and Bolts: FS FF-B-561.

G. Toggle Bolts: FS FF-B-588.

H. Wood Screws: FS FF-S-111.

I. Nails and Staples: FS FF-N-105.

1. Staples shall not be used for fastening wood structurally.

2.05 MISCELLANEOUS MATERIALS

A. Adhesives:

1. For millwork, use water resistant and mold resistant adhesive complying with Fed Spec MM-A-125, type II.
2. For plastic laminates, use phenol, resorcinol or melamine base, complying with Fed Spec MM-A-181, in type, grade and class best suited for intended use.

B. Adjustable shelving. Provide heavy duty shelf brackets and standards where shown on drawings.
1. Brackets: double slot brackets of 16 gauge anochrome steel. Size according to shelf sizes as shown on drawings.
2. Standards: double slot standards 1-1/4" wide x ½" high, constructed of anochrome steel. Lengths as called out and shown on drawings.

2.07 FABRICATION OF COUNTERS

A. General:

1. Fabricate and assemble units complete in the shop insofar as their dimensions will permit transportation and proper handling and installation.
2. For units with sectional construction:
   a. Accurately fit and align the separate parts.
   b. Provide ample screw, glue-and-bolt blocks, drawbolts, tongues, grooves, splines, dowels, tenons, mortises, and other means of fastening to render the work of this section substantial, rigid and permanently secured in the proper position.

B. Scribe members:

1. Provide sufficient additional material to permit scribing to walls, floors, and related work.
2. Provide adequate allowance for shrinkage occurring after installation.

C. Framing and blocking:

1. Assemble with bolted and screwed connections, securing to structural backings with cinch anchors, expansion screws, or toggle bolts as necessary.
2. Assemble fixtures without face nails or face screws, except as needed to attach trim.

a. Countersink face nails and face screws, fill with plastic wood or wood plug, sand smooth, and touch up to be nearly invisible.
b. Countersink the heads of all screws in every surface.

D. Cut and fit the work of this section as necessary to receive, clear, engage, or support other parts of the work, and as needed for interface with electrical, plumbing, and other units.

3. EXECUTION

3.01 INSTALLATION OF CASEWORK AND COUNTERS

A. Install at the locations shown on the drawings, and in accordance with the approved shop drawings.

1. Scribe units to wall, floor, and other surfaces as appropriate, with not more than 1/32" clear between the cabinet or fixture and the abutting permanent surface, and with no change of clearance in excess of 0.01" in any 4".
2. Set each unit square, level, plumb, and aligned within a tolerance of one in 1000 vertically and horizontally, and within 1/4" of the designated location for free-standing work.

3.02 COORDINATION

A. Coordinate the time of installation with availability of other trades to make required utility connections.

1. Provide access panels as needed for connection and maintenance of utilities.
2. Test each plumbing and electrical item through at least five operating cycles, and adjust as needed to achieve optimum operation.

3.03 ADJUST AND CLEAN

A. Upon completion of installation, thoroughly clean each item by use of only such cleaning materials as are recommended by the manufacturer of the item being cleaned.

B. Touch up scratches and abrasions to be completely invisible to the unaided eye from a distance of five feet.

END 06200

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor Provide:
1. Extruded polystyrene rigid board insulation at perimeter of foundation walls.
2. Batt and blanket insulation used for thermal resistivity and/or sound attenuation.

1.02 REFERENCES

A. ANSI/ASTM C209 - Insulating Board (Cellular Fiber), Structural and Decorative.
B. ANSI/ASTM D2842 - Water Absorption of Rigid Cellular Plastics.
C. ASTM E96 - Water Vapor Transmission of Materials.
D. FS L-P-375 - Plastic Film, Flexible, Vinyl Chloride.
E. FS HH-I-524C - Insulation Board, Thermal (Polystyrene).
F. FS HH-I-530 - Insulation Board, Thermal (Urethane).
G. ASTM C552 - Insulation Block and Boards, Thermal (Cellular Glass).
H. ANSI/ASTM E84 - Surface Burning Characteristics of Building Materials.
I. FS-HH-I-521F, Type I, II, III - Thermal Insulation Blankets.
J. FS L-P-375 - Plastic Film, Flexible, Vinyl-Chloride.
K. ASTM C665 - Insulation Blankets, Acoustical.

1.03 SUBMITTALS. In accord with 01300, provide product literature and installation instructions for insulation materials.

2. PRODUCTS

2.01 RIGID BOARD INSULATION

A. Acceptable Manufacturers
1. Tex-Styrene Inc.
2. Dow Chemical
3. W. R. Grace.

B. Insulation Materials - Perimeter of Foundation: Extruded cellular polystyrene; minimum thermal resistance "R" per inch of 5.0; minimum compressive strength of 30 psi; water absorption by volume in accordance with ANSI/ASTM D2842 0.3 percent. Thickness as indicated on drawings.

C. Insulation Materials - Masonry Cavities: “Thermax” glass fiber reinforced polyisocyanurate; minimum thermal resistance "R" per inch of 6.5; minimum compressive strength of 25 psi; water absorption by volume in accordance with ANSI/ASTM C209 less than 0.05 percent; factory applied skin of aluminum foil on both faces. Thickness as shown on drawings.

C. Adhesive Materials: Adhesive: as recommended by insulation manufacturer for application.

D. Accessories
1. Nails or Staples: Steel wire; type and size to suit application.
2. Tape: Bright aluminum or Polyester, self-adhering; 2 inches wide.

2.02 BATT AND BLANKET INSULATION

A. Acceptable Manufacturers:
1. Owens Corning Fiberglas Corp.
2. U. S. Gypsum Co.
3. Manville Corp.

B. Materials:

1. Batt Insulation: FS HH-I-521F; preformed glass fiber roll; Type II- with non-reflective covering one side; Thickness or R value as called out on drawings.
2. Nails or Staples: Steel wire; type and size to suit application.
3. Fire safety insulation: as manufactured by USG, Thermafiber, Owens-Corning or Fibrex.
4. Tape: Polyester self-adhering type.

3. EXECUTION

3.01 RIGID BOARD INSULATION

A. Preparation
1. Verify substrate and adjacent materials and insulation boards are dry and ready to receive insulation.
2. Verify substrate surface is flat, free of honeycomb, fins and irregularities, and that waterproofing is in place on exterior foundation wall.

B. Installation - Foundation Perimeter
1. Apply adhesive in three continuous beads per board length.
2. Install boards on foundation wall perimeter, horizontally. Place boards in a method to maximize contact bedding. Stagger end joints. Butt edges and ends tight to adjacent board and to protrusions.

3.02 BATT AND BLANKET INSULATION

A. Preparation:
1. Verify adjacent materials are dry and ready to receive installation.
2. Verify mechanical and electrical services within walls have been installed and tested.

B. Installation
1. Install batt insulation and vapor/air barrier in accordance with manufacturer's instructions.
2. Install batt insulation with integral vapor barrier in exterior walls shown as having this type of insulation without gaps or voids, to form a continuous thermal envelope.
3. Trim insulation neatly to fit spaces. Use batts free of damage.
4. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within the plane of insulation. Leave no gaps or voids. Fit insulation into voids created at corners and intersection of interior and exterior walls while these voids are accessible from the exterior (prior to installation of wall sheathing.)
5. Place vapor barrier facing to warm side of wall. Tape seal tears or cuts in facing.
6. Provide fire safing insulation packed tightly around penetrations through fire rated elements.

END 07200

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor Provide:
1. Pre-finished, concealed fastener, metal wall panel systems with related metal trim and accessories.
2. Soffit panels.

1.02 REFERENCES

A. AAMA (American Architectural Manufacturer's Association) - Voluntary Specifications for High Performance Organic Coatings on Coil
B. ASCE (American Society of Civil Engineers): www.asce.org/codes-standards.
C. ASTM A755 - For Steel Sheet.
D. ASTM C920 - For Elastomeric Joint Sealants.

1.03 Related Sections:

A. 05500 Miscellaneous Metal

B. 07200 Insulation

C. 07600 Flashing & Sheet Metal

D. 13340 Metal Building Systems

1.04 SUBMITTALS. In accord with 01300, provide:

A. Action Submittals:
1. Product Data - Manufacturer's data sheets for specified products.
2. Shop Drawings showing layouts of metal panels, details of each condition of installation, panel profiles, and attachment to the building. Provide details at a minimum scale of 1 ½" per foot for edge conditions, joints, fastener and sealer placement, flashings, openings, penetrations, and special details.Make distinctions between factory and field assembled work.
3. Samples for initial selection: For each exposed product, provide representative color charts of the manufacturer's full range of colors.
4. Samples for verification: Provide 12-inch long section of each metal panel profile and color chip(s) verifying color selection(s).

B. Informational Submittals:
1. Manufacturer's warranty: Unexecuted sample copy of manufacturer's warranty.

C. Closeout Submittals:
1. Maintenance Data.
2. Maufacturer's Warranty: Executed copy of manufacturer's warranty.

1.05 Warranty

A. Special Panel Finish Warranty: For extended warranty requirements for wall panels, see Section 13340 -Metal Building Systems, 1.08-B.1.c.

2. PRODUCTS

2.01 Pre-finished metal wall panels

A. Wall Panel 'A' - Vertically Oriented - Provide the metal building manufacturer's pre-finished, concealed fastener, 24-gauge, metal siding system designed to be installed vertically, including trim, fasteners, and accessories for a complete installation.

1. Acceptable Maunfacturers: Same as Acceptable Manufacturers of Metal Building Systems. See Section 13340.
2. Colors to be selected by Architect from Manufacturer's full range of colors.

B. Wall Panel 'B' - Horizontally Oriented - Provide a pre-finished, concealed fastener, 24-gauge, metal siding system designed to be installed horizontally, including trim, fasterners, and accessories to make a complete installation.

1. Acceptable Manufacturers
   a. Cascade CC-260 by Centria
   b. MasterLine 16 by MBCI
   c. Precision Series by Pac-Clad

2. Colors to be selected by Architect from Manufacturer's full range of colors.

3. EXECUTION

3.01 Delivery, Storage, and Handling

A. Handle and store products to prevent staining, denting, deterioration of components, or other damage.

B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

3.02 Installation

A. Examine metal panel substrate with installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of the metal panels. Verify that site conditions are acceptable. Do not proceed with installation until unacceptable conditions are corrected.

B. Install metal panel system in accordance with manufacturer's written instructions, approved shop drawings, project drawings, and referenced publications. Install metal panels in orientation, sizes, and locations indicated. Anchor panels and other components securely into place. Provide for structural and thermal movement.

C. Fasten metal panels to supports at each location indicated on approved shop drawings, at spacing and with fasteners recommended by the manufacturer. Fasten panel to support structure through leading flange. Snap-fit back flange of subsequent panel into secured flange of previous panel.

1. Cut panels in field where required using manufacturer's recommended methods.

2. Dissimilar materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by metal panel manufacturer.

D. Attach panel flashing trim pieces to supports using recommended fasteners and joint sealants.

E. Joint sealers: Install liquid sealants where indicated and where required for weatherproof performance

of metal assemblies.

1. Seal panel base assembly, openings, panel head joints, and perimeter joints using joint sealers indicated in manufacturer's instructions.

2. Seal perimeter joints between window and door openings and adjacent panels using elastomeric joint sealer.

3. Prepare joints and apply sealants per requirements of Division 07 Section "Joint Sealants".

3.03 Accessory Installation

A. General: Install metal panel accessories with positive anchorage to building and weather tight mounting; provide for thermal expansion. Coordinate installation with flashing and other components.

1. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.

2. Comply with details of assemblies utilized to establish compliance with peformance requirements and manufacturer's written installation instructions.

3. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.

3.04 Cleaning and Protection

A. Clean finished surfaces as recommended by metal panel manufacturer.

B. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Architect.

END 07420

1. GENERAL

1.01 WORK INCLUDES

A. **Base Bid:** General / Roofing Contractor provide single-ply EPDM fully adhered membrane roofing and flashing systems as shown and herein specified.

1. Install new:
   a. Insulation.
   b. Roof membrane.
   c. Seam tape
   d. Seam cover
   e. Base flashings.
   f. Termination bar.
   g. Counterflashing.
   h. Receivers & downspouts.
   i. Scuppers.

1.02 RELATED WORK

A. Specified elsewhere:
   1. 06100 - Rough Carpentry
   2. 07600 - Flashing and Sheet Metal
   4. 07900 - Joint Sealants

1.03 DEFINITIONS Roofing Systems Manufacturer: Any of the manufacturers whose systems are specified under "Acceptable Roofing System Manufacturers" in this section hereinafter called "manufacturer".

1.04 QUALITY ASSURANCE

A. Qualifications:
   1. The installing contractor shall be approved or franchised by the roofing system manufacturer.
   2. The job foreman shall be trained by the manufacturer in the installation of the specified system.
   3. The installing contractor shall comply with the Illinois Roofing Industry Licensing Act.

B. Manufacturer’s Qualifications:
   1. The A/E has certificates (CDB Form RSMC) on file from each of the specified manufacturers stating:
      a. They have examined project drawings, specifications and warranty requirements.
      b. Their specified products are acceptable for and compatible with the roofing and flashing system design.
      c. They will issue the specified warranty if the roofing and flashing systems are installed in accord with their requirements.

1.05 REFERENCES

A. Cited Standards and specified manufacturer's catalogs, current at the date of bidding documents, unless otherwise specified, are incorporated herein by reference and govern the work. If conflict is discovered between referenced Standards or catalogs and the project specifications, request written clarification from the A/E. Do not proceed with the work until receiving clarification.

B. Standards:
1. American Society for Testing and Materials (ASTM).
2. Factory Mutual Laboratories (FM).
3. Underwriters Laboratories (UL).
4. National Roofing Contractors Association (NRCA).
5. Thermal Insulation Manufacturers Association (TIMA).
6. Sheet Metal and Air Conditioning Contractors National Association (SMACNA)

1.06 SUBMITTALS

A. Make all submittals in accord with the Standard Document for Construction, Section 01 33 23.

B. Endorsement of Roofing Firm: Within 15 days of receiving the Notice of Award, submit the manufacturer's endorsement of the installing firm.

C. Shop Drawings:
1. Submit shop drawings to the manufacturer for review and comment.
2. Submit only manufacturer reviewed shop drawings to the A/E.
2. Minimum Scale for Roof Plan: 1/8" = 1'0".
3. Minimum Scale for Details: 1-1/2" = 1'0".
4. Submit the following:
   a. Tapered roof insulation plan.
   b. Base flashings.
   c. Membrane terminations.
   d. Sheet Metal:
      1) Counterflashing.
      2) Scuppers.
      3) Receivers and downspouts.

D. Samples:
1. Roof insulation, 8" x 10", two pieces
2. EPDM membrane, 8" x 10", three pices
3. Sheet metal:
   a. Metal used with roofing, 4" x 4" of each type, two pieces.

E. Product Data:
1. Manufacturer's specifications for roofing system, 2 sets.
2. Roof insulation specifications, 2 sets.

1.07 DELIVERY, STORAGE AND HANDLING

A. Per roofing manufacturer's recommendations.
B. Deliver materials requiring fire resistant classifications packaged with labels intact and legible.

1.08 JOB CONDITIONS

A. New Construction:

1. EPDM membrane roofs are over two porches or canopies and will receive runoff from a standing seam metal roof that covers the main area of the building. Runoff from the metal roof will be conducted across the EPDM membrane roof at each location to a single scupper with receiver and downspout .

2. Deck material. The EPDM membrane areas of the roof will be a steel deck of 22 gauge material.

B. Protection:
1. Protect surrounding construction from traffic and roofing equipment.
2. Restore or replace all work or materials damaged by the roofing operation.
3. Remove protection materials upon completion of the work.

C. Sequencing, Scheduling, Coordination: In accord with the Standard Documents for Construction, Section 01 31 20.

D. Comply with all regulations imposed by the Owner at this job site.

1.09 WARRANTY

A. General Contractor's: Two years in accord with the Standard Documents for Construction, Section 01 78 36.
B. Manufacturers: Execute CDB's Roofing System Manufacturer's Warranty, CDB Form RSMW; 20 year warranty period. See the final pages of this Section.

2. PRODUCTS

2.01 MATERIALS: For the entire roofing system provide adhesives, sealants, premolded and field fabricated flashings, fasteners, and other related components manufactured or recommended by the selected manufacturer.

	CODE	BRAND NAME	MANUFACTURER
A.	CAR	Sure-Seal	Carlisle SynTec Systems, Carlisle, PA.
B.	FIR	Rubbergard	Firestone Building Products Co., Carmel, IN
C.	MAN	JM EPDM60	Johns-Manville, Denver, CO.
D.	VER	Versigard	Versico, Inc., Akron, OH.

2.02 ACCEPTABLE SYSTEMS:

A. Fully adhered .060 EPDM
1. CAR Design “A”
2, FIR Rubbergard
3. MAN JM EPDM60 NR
4. VER Versigard

B. Manufacturer’s 5" wide, pressure-sensitive, self-adhering EPDM seam cover.

2.03 ROOF INSULATION

A. The Contractor shall select a brand acceptable to the roofing manufacturer.

	TYPE	ASTM	"R"/INCH
1.	Polyisocyanurate	C1289	6.00 (LTTR)

B. Roof Insulation: Polyisocyanurate; one layer, the thickness as shown on drawings.

C. Crickets, Saddles, & Sumps: Polyisocyanurate. Slope: ½ in./ft.

2.04 COVER BOARD. Cover all thermal insulation, crickets and saddles with 1/4" thick boards of fiberglass mat faced panel with treated gypsum core.

2.05 INSULATION FASTENING - ADHESIVE. Adhesive manufactured or approved by the roofing system manufacturer; and that have factory mutual approval.

2.06 OTHER MATERIALS

A. Wood Nailers: See 06100 for material specification. See drawings for width and thickness.

B. Manufacturer's EPDM Flashing.

C. Termination Bars: Required on all wall terminations. **Attach 6" o.c.**
1. 1/8" x 1-1/2" aluminum bar with a 45° sealant pocket where space permits.
2. .040" x 1" aluminum bar under **required** counterflashing.

D. Insulation mechanical fasteners: as manufactured or approved by Roofing System Manufacturer.

3. EXECUTION

3.01 ENVIRONMENTAL CONDITIONS

A. Install roofing only in dry weather.
B. Comply with the manufacturer's climatic restrictions.

3.02 INSPECTION

A. Examine all surfaces for inadequate anchorage, foreign material, moisture, unevenness, or other conditions which could prevent the best quality installation and longevity of the roofing, flashing, and accessory components. Notify the A/E of all deficiencies.
B. Do not proceed with the work until all deficiencies have been corrected to the satisfaction of the A/E, and the roofing manufacturer.

3.03 PREPARATION

A. Ensure that all surfaces are clean and dry before starting and during performance of work.
B. Verify that all work of other contractors and subcontractors which penetrates the roof deck or requires workmen and equipment to traverse the roof deck has been completed.

3.04 INSTALLATION

A. Install the roof insulation with end joints staggered at mid-point in each layer. Offset all joints between layers at tapered insulation a minimum of 6 inches.

1. First layer (thermal insulation to roof deck). . . . . Mechanically attached.
2. Crickets & saddles (to thermal insulation).. . . . . Adhesive.
4. Recovery board (fiber-reinforced gypsum board to thermal insulation. . . . . Adhesive.

B. Adhesive Attached Insulation: Using products provided or recommended by the roofing system manufacturer, and in accordance with the adhesive manufacturer's printed instructions, use field-applied foam adhesive to secure items as listed above. Application shall be by ribbons of adhesive rather than a spray application to eliminate problems associated with overspray.

C. Install the roofing and flashing system and all accessory items in accord with the manufacturer's printed instructions.

D. Install all field seams using the manufacturer's seam tape, primers, and cleaners, and in accord with the manufacturer's recommendations.

E. Centered over all field seams, apply a minimum 5" wide strip of pressure sensitive, self-adhering EPDM.

3.06 FIELD QUALITY CONTROL

A. The A/E will provide onsite observation during installation.
B. The roofing manufacturer will provide onsite observation and instruction as the manufacturer deems necessary.

3.07 ADJUST AND CLEAN

A. Carefully inspect all completed work and correct all defects.
B. Remove from the job site and legally dispose of all debris.
C. Remove all tools, equipment and construction aids.
D. Prevent storage of materials and equipment on the completed roof.
E. Accompany the manufacturer's technical inspector, and assist with equipment and workmen if necessary to provide access to the roof. Correct all defects noted during the inspection.

END 07530

1. GENERAL

1.01 SUMMARY

A. Base bid: Contractor provide
1. Pre-finished steel sheet metal as detailed on drawings and as specified herein, including, roof edges and copings.

1.02 REFERENCES

A. ANSI/ASTM B32 - Solder Metal.

B. ASTM B370 - Copper Sheet and Strip for Building Construction.

C. NAAMM - Metal Finishes Handbook.

D. NRCA (National Roofing Contractors Association) - Roofing Manual.

E. SMACNA - Architectural Sheet Metal Manual.

1.03 SYSTEM DESCRIPTION. Work of this Section is to physically protect membrane roofing and base flashings from damage that would permit water leakage to building interior.

1.04 QUALITY ASSURANCE. Applicator: Company specializing in sheet metal flashing work with three (3) years minimum experience.

1.05 SUBMITTALS

A. Submit shop drawings and product data.

B. Describe material profile, jointing pattern, jointing details, fastening methods, and installation details.

C. Submit manufacturer's installation instructions in accordance with the Standard Documents for Construction.

1.06 STORAGE AND HANDLING

A. Store products in accord with Standard Documents for Construction.

B. Stack pre-formed and pre-finished material to prevent twisting, bending, or abrasion, and to provide ventilation.

C. Prevent contact with materials during storage which may cause discoloration, staining, or damage.

1.07 WARRANTY: General Contractor provide the following minimum warranties.

A. General Contractor's: Two (2) years in accord with General Conditions.

B. Manufacturer's: Five (5) years in accord with General Conditions on the preformed expansion joint system. Twenty (20) years on the finishes.

C. Warranty shall guarantee sheet metal work to be free of leaks and defects in materials and workmanship.

2. PRODUCTS

2.01 SHEET MATERIALS (COPING CAP & COUNTER FLASHINGS)

A. Prefinished Steel: G-90 galvanized with a 70% Kynar 500 finish. Color as selected by A/E.

B. See Drawing for sizes and configurations.

2.02 ACCESSORIES

A. Fastener: Stainless steel with soft neoprene washers at exposed fasteners. Exposed fasteners shall not be used except with authorization of the A/E.

B. Sealant: Type S-1 specified in Section 07900.

2.03 FABRICATION (COPING CAP & COUNTER FLASHINGS)

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Fabricate cleats and starter strips of same material as sheet, interlockable with sheet.

C. Form pieces in longest practical lengths.

D. Hem exposed edges on underside 1/2 inch; miter and seam corners.

E. Form material with cover plate seam.

F. Fabricate corners from one piece with minimum 18 inch long legs; solder for rigidity, seal with sealant.

G. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

3. EXECUTION

3.01 INSPECTION

A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.

B. Verify membrane termination and base flashings are in place, sealed, and secure.

C. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION (COPING & COUNTER FLASHINGS)

A. Field measure site conditions prior to fabricating work.

B. Install starter and edge strips, and cleats before starting installation.

C. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.

D. Insert flashings into reglets to form tight fit. Secure in place with lead wedges at maximum 8 inches on center. Seal flashings into reglets with sealant.

E. Secure flashings in place using concealed fasteners. Use exposed fasteners only in locations approved by Architect.

F. Cleat and seal all joints.

G. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.

H. Seal metal joints watertight.

I. Provide separation between dissimilar metals.

3.03 INSTALLATION (Manufactured Expansion Joint)

A. Installation shall conform to manufacturer's written instructions.

3.04 ADJUST AND CLEAN

A. Carefully inspect all completed work. Correct all defects.

B. Remove surplus materials.

C. Provide adequate protection of completed work until substantial completion.

D. Clean up all rubbish, debris, surplus materials, tools and equipment and remove from site.

END 07600

1. GENERAL

1.01 WORK INCLUDES

A. Metal Roof Snow Guards

B. Fastening devices

1.02 REFERENCES

A. ASTM A 792 Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

B. ASTM B 209 - Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.

1.03 DESIGN / PERFORMANCE REQUIREMENTS

A. Design Requirements for Wall Systems:
1. Provide to spacing indicated on the drawings.
2. System Design: Snow guard system as designed by the manufacturer shall be a complete system. All components of the system shall be supplied by the same manufacturer.
3. Accessories and Fasteners: Accessories and fasteners shall be capable of resisting the design forces in accordance with local building code.

1.04 SUBMITTALS.

A.. Submit under provisions of Section 01300 - Submittals.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Shop drawings: Prepared specifically for this project; showing dimensions of metal roof, snow guards, and accessories, fastening details and connections and interface with other products.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer’s full range of available colors and patterns.

E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150mm) long, representing actual product, color, and patterns.

F. Manufacturer’s Certificates: Certify products meet or exceed specified requirements.

G. Closeout Submittals: Provide manufacturer’s maintenance instructions that include recommendations for periodic checking and maintenance of installed system.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in production of metal roof snow guard products of the type specified with a minimum 5 years documented experience.

B. Installer Qualifications: Company specializing in installation of metal roof snow guard products of the type specified with a minimum 3 years documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver components to job site properly packaged to provide protection against transportation damage.

B. Store products in manufacturer's unopened packaging in a clean, dry location until ready for installation.

C. Stack all materials to prvent damage and to allow for adequate ventilation.

1.07 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.08 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

2. PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers
1. SNO-BARRICADE by Sno-Gem, Inc., McHenry, IL 60050; 888-766-4367
2. Snow Dam by Thybar Corporation, Addison, IL 800-666-2872
3. Snow Retention System by Pac-Clad, Elk Grove Village, IL 800-PAC-CLAD

2.02 MATERIALS

A. Aluminum Sheet: Aluminum sheet conforming with ASTM B 209. Available in .032, .040, and .050 gauge sheet.

B. Factory Finish: Kynar 500 PVDF resin-based coating, applied by the manufacturer on a continuous coil coating line.
1. Standard top side color coating comprised of a 0.70-0.80 mil full strength, 70% Kynar 500/Hylar 5000 fluorocarbon (Polyvinylidene Fluoride PVF2) coating over urethane primer of 0.20-0.30 mil on finish side. Total face dry film thickness: 1.0 mil + 0.2 mil.
2. Reverse side shall be coated with primer and wash coat of 0.30 mil plus or minus 0.05 mil.
3. Finish shall conform to all tests for adhesion, flexibility, and longevity as specified by the Kynar 500 PVDF resin-based coating supplier.
4. Color:
   a. As selected to match roof color from the manufacturer's standard range.

2.03 APPLICATIONS/SCOPE

A. Snow guard for standing seam metal roof systems.
1. Double retention bar clamp-on standard snow guard designed for standard profile standing seam metal roofs.
   a. Dimensions
      1) Height: 4-3/4 inches
      2) Width: 6-1/2 inches
      3) Depth: 1-1/4 inches
   b. Components
      1) Barricade clamps
      2) Stainless steel set screws

3) 1 inch square tubing
a) Aluminum
4) End caps
5) Inserts
6) Barricade plates:
a) Aluminum

c. Finish
1) Kynar Coating

3. EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation and the approved shop drawings.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Install in accordance with snow guard manufacturer's instructions and the approved shop drawings. Coordinate the installation with the manufacturer of the roof substrate to which it is installed.

B. Snow guard models: Clamp-on to standing seam: Install in accordance with the manufacturer's instructions. Following installation inspect and verify the following:
1. Inspect each clamp to insure assembly is intact.
2. Inspect and check each set screw to insure proper fastening has been maintained.
3. Inspect tubing has bent or shows any other evidence of failure or damage, contact the manufacturer immediately.
4. Inspect barricade plate set screw for tightness.

3.04 PROTECTION

A. Clean any grease, finger marks or stains from the panel per manufacturer's recommendations.

B. Touch-up, repair, or replace damged products before substantial completion.

END 07720

1. GENERAL

1.01 SECTION INCLUDES

A. Base Bid: Contractor provide:
1. Sealant substrate surfaces.
2. Sealant and backing

1.02 REFERENCES

A. ANSI/ASTM D1056 - Flexible Cellular Materials - Sponge or Expanded Rubber.

B. ANSI/ASTM D1565 - Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Open-Cell Foam).

C. ASTM C790 - Use of Latex Sealing Compounds.

D. ASTM C804 - Use of Solvent-Release Type Sealants.

E. ASTM C834 - Latex Sealing Compounds.

F. FS TT-S-001657 - Sealing Compound, Single Component, Butyl Rubber Based, solvent Release Type.

G. FS TT-S-00227 - Sealing Compound: Elastomeric Type, Multi-Component.

H. FS TT-S-00230 - Sealing Compound: Elastomeric Type, Single Component.

I. SWI (Sealing and Waterproofers Institute) - Sealant and Caulking Guide Specification.

1.03 SUBMITTALS

A. Submit product data under provisions of Section 01300.

B. Submit product data indicating sealant chemical characteristics, performance criteria, limitations, color availability and application instructions.

1.04 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum 3 years documented experience.

B. Applicator: Company specializing in applying the work of this Section with minimum 3 years documented experience and approved by sealant manufacturer.

C. Conform to Sealant and Waterproofers Institute requirements for materials and installation.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Do not install solvent curing sealants in enclosed building spaces.

B. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.06 SEQUENCING AND SCHEDULING: Coordinate the work of this Section with all Sections referencing this Section.

1.07 WARRANTY

A. Provide three year warranty under provisions of Section 01700.

B. Warranty: Include coverage of installed sealants and accessories which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

1.08 DELIVERY AND STORAGE: Deliver materials in unopened containers as packaged by manufacturer. Store in a manner to protect materials from weather.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Pecora Chemical Corp.
B. Tremco Manufacturing Co.
C. Sonneborn Division of Contech
D. Republic Powdered Metals, Inc.

2.02 INTERIOR CAULKS. Polyurethane Sealant: single-component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, non-sagging in vertical joints, self-leveling in horizontal joints; color as selected by A/E:

A. Elongation Capability 1,000 percent

B. Service Temperature Range -40 to 180 degrees F

C. Shore A Hardness Range 20 to 35

2.03 EXTERIOR SEALANTS - BUILDING. Polyurethane Sealant: single-component, chemical curing, non-staining, non-bleeding, capable of continuous water immersion, non-sagging in vertical joints, self-leveling in horizontal joints; color as selected by A/E:

A. Elongation Capability 1,000 percent

B. Service Temperature Range -40 to 180 degrees F

C. Shore A Hardness Range 20 to 35

2.04 EXTERIOR SEALANT - PAVEMENT JOINTS. Two-component urethane, for use in parking lot and sidewalk joints. Color as selected by A/E.

2.05 EXTERIOR SEALANT - EIFS. Sealant compatible with and approved by EIFS manufacturer.

2.06 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: ANSI/ASTM D1056 and D1565 round. In vertical joints use closed cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width. In horizontal joints, use solid neoprene or butyl rubber, Shore A hardness of 70.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

3. EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and joint openings are ready to receive work and field measurements are as shown on Drawings and recommended by the manufacturer.

B. Beginning of installation means installer accepts existing substrate.

3.02 PREPARATION

A. Clean and prime joints in accordance with manufacturer's instructions.

B. Remove loose materials and foreign matter which might impair adhesion of sealant.

C. Verify that joint backing and release tapes are compatible with sealant.

D. Perform preparation in accordance with ASTM C804 for solvent release and C790 for latex base sealants.

E. Protect elements surrounding the work of this Section from damage or disfiguration.

3.03 INSTALLATION

A. Install sealant in accordance with manufacturer's instructions.

B. Measure joint dimensions and size materials to achieve required width/depth ratios.

C. Install joint backing to achieve a neck dimension no greater than 1/3 the joint width.

D. Install bond breaker where joint backing is not used.

E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

G. Tool joints concave. Sealant shall achieve a firm skin before surface coating is applied.

3.04 CLEANING AND REPAIRING

A. Clean adjacent soiled surfaces.
B. Repair or replace defaced or disfigured finishes caused by work of this Section.

3.05 PROTECTION OF FINISHED WORK

A. Protect finished installation.

B. Protect sealants until cured.

3.06 SCHEDULE

A. Interior, where shown on drawings and:

1. Perimeter of door and window frames.
2. Juncture of casework and adjacent walls.
3. Juncture of plumbing fixtures and adjacent construction.

4. Juncture of steel tube members and adjacent contruction.

B. Exterior, where shown on drawings and:

1. Perimeter of door frames and windows.
2. Joints in metal copings counterflashings.
3. Juncture of EIFS and adjacent construction.
4. Horizontal joints in pavements and sidewalks.

END 07900

1. GENERAL

1.01 WORK INCLUDED

A. Base Bid: Contractor provide non-rated and fire rated rolled steel doors and frames.

1.02 REFERENCES

A. ASTM E152 - Methods of Fire Tests of Door Assemblies.
B. DHI - Door Hardware Institute: The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.
C. SDI-100 - Standard Steel Doors and Frames.
D. SDI-105 - Recommended Erection Instructions for Steel Frames.
E. UL 10B - Fire Tests of Door Assemblies.

1.03 QUALITY ASSURANCE

A. Conform to requirements of SDI-100.
B. Installed frame and door assembly to conform to UL 10B for fire rated class indicated as scheduled.

1.04 REGULATORY REQUIREMENTS: Conform to applicable local building codes for fire rated requirements of metal door/metal frame and wood door/metal frame assemblies.

1.05 SUBMITTALS

A. Submit shop drawings, and manufacturer's installation instructions, under provisions of Section 01300.
B. Indicate frame configuration, anchor types and spacings, location of cutouts for hardware, reinforcement, and finish.
C. Indicate door elevations, internal reinforcement, closure method, and cut outs for glazing.

1.06 DELIVERY, STORAGE AND PROTECTION

A. Protect products under provisions of Section 01600.
B. Protect doors and frames with resilient packaging.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Steel Craft
B. Republic Builders Products
C. Ceco Corporation
D. Curries Manufactures, Corp.

2.02 DOORS AND FRAMES

A. Doors: SDI-100 Grade II Model 1 (Interior) and 2 (Exterior).

B. Unless scheduled otherwise on drawings:
1. Exterior Frames: 14 gage thick material.
2. Interior Frames: 16 gage thick material.
3. Exterior Doors: 16 gage thick material.
4. Interior Doors: 18 gage thick material.

2.03 DOOR CORE

A. Core: Impregnated cardboard honeycomb at interior, non-rated doors; Polyurethane or Polystyrene

insulation at exterior doors. Provide fire-rated cores as scheduled and/or as required to meet local codes.

B. Insulated door insulation value of 8.

2.04 ACCESSORIES

A. Rubber Silencers: Resilient rubber.
B. Glazing Stops: Rolled steel channel shape, mitered corners; prepared for countersink style screws.

2.05 PROTECTIVE COATINGS: Primer: Zinc chromate type.

2.06 FABRICATION

A. Fabricate frames as welded unit type.
B. Fabricate frames and doors with hardware reinforcement plates welded in place. Provide mortar guard boxes.
C. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head.
D. Prepare frame for silencers. Provide three single rubber silencers for single doors and mullions of double doors on strike side, and two single silencers on frame head at double doors without mullions.
E. Attach fire rated label to each frame and door unit.
F. Close top edge of exterior door flush with inverted steel channel closure. Seal joints watertight.
G. Provide bitumastic coating on the inside face of all hollow metal door frames to receive grout.

2.07 FINISH. Baked on Primer .

3. EXECUTION

3.01 INSTALLATION

A. Install frames in accordance with SDI-105.
B. Install doors in accordance with DHI.
C. Coordinate with masonry and wallboard construction for anchor placement.
D. Coordinate installation of glass and glazing.
E. Install roll formed steel reinforcement channels between two abutting frames. Anchor to structure and floor.

3.02 TOLERANCES: Maximum Diagonal Distortion: 1/8 inch measured with straight edge, corner to corner.

3.03 ADJUSTING AND CLEANING: Adjust hardware for smooth, quiet and balanced door movement.

END 08100

1. GENERAL

1.01 WORK INCLUDED

A. Base Bid: Contractor provide: fire rated and non-rated wood doors.

1.02 REFERENCES

A. ANSI/NWMA I.S.1 - Industry Standard For Wood Flush Doors (Includes Standards I.S.1.1 through I.I.S.1.7).

B. ANSI A135.4 - Basic Hardboard.

C. ASTM E90 - Measurement of Airborne Sound Transmission Loss of Building Partitions.

D. ASTM E152 - Methods of Fire Tests of Door Assemblies.

E. AWI - Quality Standards of Architectural Woodwork Institute.

F. UL 10B - Fire Tests of Door Assemblies.

1.03 PERFORMANCE: Acoustic Rating for Door Assembly: ASTM E90, minimum STC 35.

1.04 QUALITY ASSURANCE: Conform to requirements of AWI Quality Standard Section 1300 and 1400 Custom Grade. for fire rated class as scheduled.

1.05 REGULATORY REQUIREMENTS: Conform to applicable local building code for fire rated doors.

1.06 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01300.

B. Indicate door elevations, stile and rail reinforcement, internal blocking for hardware attachment, and cutouts for glazing.

C. Submit manufacturer's installation instructions and samples under provisions of Section 01300.

1.07 DELIVERY, STORAGE, AND PROTECTION

A. Protect products under provisions of Section 01600.

B. Seal all four edges of doors when delivered to job site.

C. Package, deliver, and store doors in accordance with AWI requirements.

1.09 WARRANTY. Provide life-of-installation manufacturer's warranty under provisions of Section 01700. Guarantee shall provide for complete replacement of defective doors, including hanging and finishing.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Marshfield Door Systems
B. Eggers Industries
C. Graham

2.02 DOOR TYPES: Flush Interior Doors: 1-3/4 inches thick; solid core construction; wood veneer faces, fire rated as indicated.

2.03 DOOR CONSTRUCTION (AWI QUALITY STANDARD)

A. Solid, Non-Rated Core: AWI Section 1300, SRC-Stile and Rail.

B. Solid, Fire Rated Core: AWI Section 1300, Type FD 1-1/2. in locations as scheduled and as required to meet codes.

2.04 FLUSH DOOR FACING

A. Facing Quality: AWI custom grade.

B. Flush Interior Door Veneer: **Plain Sliced White Oak.**

C. Finish to be selected by owner from manufacturers full range of standard color chart.

2.05 ADHESIVES Interior Doors: AWI, Type II.

2.06 ACCESSORIES: Glass Stops: Rolled metal type designed to conform to UL requirements.

2.07 FABRICATION

A. Fabricate non-rated doors in accordance with AWI Quality Standards requirements.

B. Fabricate fire rated doors in accordance with AWI Quality Standards and to UL requirements. Attach fire rating label to door edge.

C. Provide flush doors with 1/2 inch thick edge strips of wood species to match face veneer.

D. Premachine doors for finish hardware.

E. Provide metal astragals in one piece to UL requirements for double fire doors to rating required.

3. EXECUTION

3.01 INSTALLATION

A. Install doors in accordance with manufacturer's instructions, and NFPA for fire-rated doors.

B. Machine cut relief for hinges and closers and coring for handsets and cylinders.

C. Trim door width by cutting equally on both jamb edges. Trim fire door width from lock edge only, to a maximum of 3/16 inch. edges.

D. Prepare doors to receive finish hardware in accordance with ANSI/AWMA requirements.

E. Conform to ANSI/AWMA requirements for fit tolerances.

F. Coordinate installation of glass and glazing.

3.02 INSTALLATION TOLERANCES: Maximum Diagonal Distortion: 1/8 inch measured with straight edge, corner to corner.

3.03 ADJUSTING AND CLEANING

A. Adjust for smooth and balanced door movement.

B. Clearances (Non-Fire Rated Doors).

1. Maximum 1/8" at jamb & head for job fit doors; 3/16" for prefit doors.
2. Maximum 3/16" at threshold or saddle; 1/2" over decorative floors without thresholds.

C. Clearances (Fire Rated Doors)

1. Maximum 1/8" between door and frame and between pairs of doors.
2. Maximum 1/2" at bottom of single door over decorative floor.
3. Maximum 3/8" at bottom of double doors over decorative floor.

END 08200

1. GENERAL

1.01 WORK INCLUDED

A. Base Bid:

1. **General Contractor** provide:

a. Electrically operated overhead sectional door.
b. Steel, insulated panels of flush design.
c. Operating hardware and supports.
d. Glass and glazing.

1.02 REFERENCES

A. ANSI A216.1 - Section Overhead Type Door (NAGDM 102).
B. ANSI/ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot Dip Process, Structural (Physical) Quality.
C. ANSI/ASTM A526 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot Dip Process, Commercial Quality.
D. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
E. ASTM B221 - Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
F. NEMA - National Electrical Manufacturer's Association.

1.03 SYSTEM DESCRIPTION

A. Panels: Flush steel; 2" thick.
B. Normal headroom track and hardware.
C. Electric operation on 208 volt, single phase, 60 Hz service. Horsepower of motor as determined by door manufacturer to facilitate the door size and have a transit time of 12 inches per second (minimum). Capable of manual operation in case of power failure.

1.04 QUALITY ASSURANCE

A. Manufacturer: Company specializing in overhead door construction with three years minimum experience.
B. Installer: Company specializing in installing overhead doors with two years documented experience.
C. Door Construction: ANSI A216.1.

1.05 SUBMITTALS

A. Submit shop drawings, product data and manufacturer’s installation instructions under provisions of Section 01340.
B. Indicate opening dimensions and tolerances, component construction, connections and details, anchorage methods and spacing, hardware and locations and installation details.

1.06 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Section 01730.
B. Include data for motor and transmission, shaft and gearing, lubrication frequency, control adjustments, and spare part sources.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Overhead Door Corporation.
B. Raynor Manufacturing Company
C. Clopay Door Products
D. Delden Manufacturing Company
E. Fimbel Garage Doors
F. C.H.I. Overhead Doors
G. HAAS Door Company

2.02 DESCRIPTION

A. 2" thick sections, roll-formed commercial quality hot-tipped galvanized steel per ASTM A924 & A653.
B. Door sections constructed of 26 ga. Stucco-embossed, exterior & interior skins, mechanically interlocked and pressure bonded to a 1-7/8" thick expanded polystyrene core.
C. Exterior and interior skins to be separated by a continuous dual durometer vinyl extrusion held in place by a mechanical interlock, to form an effective thermal break and complete weather-tight seal along the entire section joints.
D. Stiles to be 18ga., separated from exterior skin with vinyl thermal break.
E. When tested in accordance with ASTM C177, shall exhibit the following thermal value: R 12 minimum.
F. Finish: Exterior and interior skins shall be pre-coated prior to roll-forming with a two coat process of baked-on polyester finish over expoxy primer. Exterior color will be selected by the A/E from manufacturer's standard colors. Interior skin shall be white.
G. Glazing. Provide two lite inserts for each overhead door. Each insert to be secured in 24" x 8" (nominal) opening with rubber glazing gasket. Provide ½" or 5/8" thick clear insulated glass.
H. Tracks: 3 inch 12 ga. hot-dipped galvanized, continuous angle mounted and fully adjustable for sealing door to jamb. Continuous angle size shall not be less than 3-1/2" x 6" x 1/8". Horizontal track to be adequately reinforced with continuous angle.
I. Hardware. Provide hinges and brackets of galvanized steel. Heavy Duty steel rollers shall have hardened steel balls.
J. Spring counterbalance. Heavy duty oil-tempered torsion springs on a continuous ball bearing cross-header shaft. Galvanized aircraft type lifting cables with minimum safety factor of 5 to 1.
K. Provide electric operation with properly protected 208 volt motors.
L. Provide electric operating controls - to be mounted on wall where shown on drawings. Controls to include a safety edge to reverse downward action.
M. Provide jamb seals to seal the door when in the closed position.
N. Windload: 12 p.s.f. (70 mph standard) Material U-bar 18 ga.

3. EXECUTION

3.01 INSPECTION

A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within limits.
B. Beginning of installation means acceptance of existing surfaces.

3.02 PREPARATION

A. Prepare opening to permit correct installation of door unit and air and vapor barrier seal.
B. Apply sealer.

3.03 INSTALLATION

A. Install door unit assembly in accordance with manufacturer's instructions.
B. Use anchorage devices to securely fasten assembly to wall construction and building framing without distortion or stress.
C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.

D. Fit and align door assembly including hardware, level and plumb, to provide smooth operation.
E. Coordinate installation of electrical service. Complete wiring from disconnect to unit components.
F. Coordinate installation of sealants and backing materials at frame perimeter as specified in Section 07900.
G. Install perimeter trim and closures.
H. Install glass and glazing watertight.

3.04 TOLERANCES

A. Maintain dimensional tolerances and alignment with adjacent work.
B. Variation from Plumb: 1/16 inch maximum.
C. Variation from Level: 1/16 inch maximum.
D. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch from 10 ft straight edge.

3.05 ADJUSTING AND CLEANING

A. Adjust door assembly.
B. Clean doors, frames and glass.
C. Remove labels and visible markings.

END 08360

1. GENERAL

1.01 WORK INCLUDED

A. Base Bid: Contractor provide thermally broken, fixed, aluminum windows to include:

1. Aluminum frames and glazed lights.
2. Anchors, brackets, and attachments.
3. Perimeter sealant.

1.02 REFERENCES

A. ANSI/ASTM A36 - Structural Steel

B. ANSI/ASTM A386 - Zinc Coating (Hot-Dip) on Assembled Steel Products.

C. ANSI/ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

D. ANSI/ASTM B221 - Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube.

E. ANSI/ASTM E283 - Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors.

F. ANSI/ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

G. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.

H. FS TT-P-641 - Primer Coating; Zinc Dust-Zinc Oxide (for Galvanized Surfaces).

I. FS TT-P-645 - Primer, Paint, Zinc Chromate, Alkyd Type.

1.03 SYSTEM DESCRIPTION AND PERFORMANCE

A. Architectural Requirements:

1. Drawings are diagrammatic and do not purport to identify or solve problems of thermal or structural movement, glazing or anchorage.
2. Requirements shown by details are intended to establish basic dimensions of units, sightlines and profiles of members.
3. Provide concealed fastening wherever possible.

B. Structural Requirements:

1. System to provide for expansion and contraction within system components caused by a cycling temperature range of 170 F degrees without causing detrimental effects to system or components.
2. Design and size members to withstand dead loads and live loads caused by pressure and suction of wind as calculated in accordance with building code, and measured in accordance with ANSI/ASTM E330.
3. Limit mullion deflection to L/200, or flexure limit of glass with full recovery of glazing materials, whichever is less.
4. System to accommodate, without damage to system or components, or deterioration of perimeter seal: Movement within system; movement between system and perimeter framing components; dynamic loading and release of loads; and deflection of structural support framing.
5. Attachment considerations shall take into account site peculiarities and expansion and

contraction movements so there is no possibility of loosening, weakening or fracturing connection between units and building structure or between units themselves.

6. Design anchors, fasteners and braces to be structurally stressed not more than 50% of allowable stress when maximum loads are applied.
7. Engineer entrances to be free from rattles, wind whistles and noise due to thermal and structural movement and wind pressure.

C. Environmental Requirements:

1. Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to exterior. No leakage shall occur in wall when tested in accordance with ASTM E331 at test pressure of 6.24 psi.
2. Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of assembly surface area, measured at a reference differential pressure across assembly of 0.3 inches water gage as measured in accordance with ANSI/ASTM E283.
3. Thermal performance: “U” value .58 (maximum).

1.04 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01300.

B. Include system and component dimensions; descriptive literature on components within assembly; framed opening requirements and tolerances; anchorage and fasteners; glass and infills; door hardware requirements; and affected related work.

C. Submit manufacturer's installation instructions under provisions of Section 01300.

D. Submit samples under provisions of Section 01300.

E. Submit 2 samples, illustrating prefinished aluminum surface (4 x 4 inches) and specified glass (12 x 12 inches), and 6 inch door corner section.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver and handle system components under provisions of Section 01600.

B. Store and protect system components under provisions of Section 01600.

C. Provide wrapping to protect prefinished aluminum surfaces.

1.06 WARRANTY

A. Provide two year warranty jointly signed by manufacturer and installer under provisions of Section 01740. Provide an additional 3 year warranty on sealed glass units.

B. Warranty: Cover complete system for failure to meet specified requirements.

1.07 COORDINATION. Manufacturer shall be responsible for details and dimensions not controlled by job conditions and shall show on his shop drawings required field measurements beyond his control. Coordinate with responsible trades to establish, verify and maintain field dimensions and job conditions.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Kawneer

B. Tube-lite
C. US Aluminum

2.02 MATERIALS

A. Extruded Aluminum: ANSI/ASTM B221; 6063-T5 alloy,temper.

B. Sheet Aluminum: ASTM B209;5005-H16 alloy, temper.

C. Sheet Steel: ANSI/ASTM A446; hot-dipped galvanized.

D. Steel Sections: ANSI/ASTM A36; shapes to suit mullion sections.

E. Primer and Touch-Up Primer for Galvanized Surfaces: FS TT-P-645.

F. Fasteners: compatible with aluminum.

G. Thermal barrier: Two-part, chemical curing, high density polyurethane; mechanically and adhesively bound to the aluminum.

2.03 FRAME. Thermally broken with flush glazing stops and internal weep drainage system. Nominal dimensions 2" x 4.5". Screw spline joinery, center glazed from either interior or exterior, EPDM gaskets in reglets.

2.04 GLASS AND GLAZING MATERIALS: Glass and Glazing Materials: As specified in Section 08800.

2.05 FABRICATION

A. Fabricate frames allowing for minimum clearances and shim spacing around perimeter of assembly, yet enabling installation.

B. Rigidly fit and secure joints and corners with internal reinforcement, except that door corners will be welded. Make joints and connections flush, hairline, and weatherproof.

C. Develop drainage holes with moisture pattern to exterior.

D. Prepare components to receive anchor devices. Fabricate anchorage items.

E. Arrange fasteners, attachments, and jointing to ensure concealment from view.

F. Prepare components with internal reinforcement for door hardware.

2.09 FINISHES: Extruded Aluminum Surfaces: as selected from manufacturer’s standard colors.

3. EXECUTION

3.01 INSPECTION

A. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this Section.
B. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

A. Install windows and glazing in accordance with manufacturer's instructions.
B. Use anchorage devices to securely attach frame assembly to structure.
C. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

D. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
E. Install glass in accordance with Section 08800, using exterior combination method of glazing.
F. Install perimeter 1 part polyurethane type sealant, backing materials, and installation requirements in accordance with Section 07900.

3.03 TOLERANCES

A. Variation from Plane: 0.03 inches per foot maximum or 0.25 inches per 30 feet, whichever is less.
B. Misalignment of Two Adjoining Members Abutting in Plane: 0.015 inches.

3.04 CLEANING/REPAIRING/REPLACEMENT

A. Remove protective material from prefinished aluminum surfaces.
B. Wash down exposed surfaces using a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.
D. Replace scratched, cracked, chipped or otherwise damaged glass and framing.

END 08400

1. GENERAL

1.01 WORK INCLUDED

A. Base Bid: Contractor provide thermally broken aluminum storefront systems to include:

1. Aluminum doors, frames and glazed lights.
2. Anchors, brackets, and attachments.
3. Door hardware.
4. Perimeter sealant.

1.02 REFERENCES

A. ANSI/ASTM A36 - Structural Steel

B. ANSI/ASTM A386 - Zinc Coating (Hot-Dip) on Assembled Steel Products.

C. ANSI/ASTM A446 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.

D. ANSI/ASTM B221 - Aluminum-Alloy Extruded Bar, Rod, Wire, Shape, and Tube.

E. ANSI/ASTM E283 - Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors.

F. ANSI/ASTM E330 - Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

G. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.

H. FS TT-P-641 - Primer Coating; Zinc Dust-Zinc Oxide (for Galvanized Surfaces).

I. FS TT-P-645 - Primer, Paint, Zinc Chromate, Alkyd Type.

1.03 SYSTEM DESCRIPTION AND PERFORMANCE

A. Architectural Requirements:

1. Drawings are diagrammatic and do not purport to identify or solve problems of thermal or structural movement, glazing or anchorage.
2. Requirements shown by details are intended to establish basic dimensions of units, sightlines and profiles of members.
3. Provide concealed fastening wherever possible.

B. Structural Requirements:

1. System to provide for expansion and contraction within system components caused by a cycling temperature range of 170 F degrees without causing detrimental effects to system or components.
2. Design and size members to withstand dead loads and live loads caused by pressure and suction of wind as calculated in accordance with building code, and measured in accordance with ANSI/ASTM E330.
3. Limit mullion deflection to L/200, or flexure limit of glass with full recovery of glazing materials, whichever is less.
4. System to accommodate, without damage to system or components, or deterioration of perimeter seal: Movement within system; movement between system and perimeter framing components; dynamic loading and release of loads; and deflection of structural support framing.

5. Attachment considerations shall take into account site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening or fracturing connection between units and building structure or between units themselves.
6. Design anchors, fasteners and braces to be structurally stressed not more than 50% of allowable stress when maximum loads are applied.
7. Engineer entrances to be free from rattles, wind whistles and noise due to thermal and structural movement and wind pressure.

C. Environmental Requirements:

1. Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to exterior. No leakage shall occur in wall when tested in accordance with ASTM E331 at test pressure of 6.24 psi.
2. Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of assembly surface area, measured at a reference differential pressure across assembly of 0.3 inches water gage as measured in accordance with ANSI/ASTM E283.
3. Thermal performance: “U” value .58 (maximum).

1.04 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01300.

B. Include system and component dimensions; descriptive literature on components within assembly; framed opening requirements and tolerances; anchorage and fasteners; glass and infills; door hardware requirements; and affected related work.

C. Submit manufacturer's installation instructions under provisions of Section 01300.

D. Submit samples under provisions of Section 01300.

E. Submit 2 samples, illustrating prefinished aluminum surface (4 x 4 inches) and specified glass (12 x 12 inches), and 6 inch door corner section.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver and handle system components under provisions of Section 01600.

B. Store and protect system components under provisions of Section 01600.

C. Provide wrapping to protect prefinished aluminum surfaces.

1.06 WARRANTY

A. Provide two year warranty jointly signed by manufacturer and installer under provisions of Section 01700. Provide an additional 3 year warranty on sealed glass units.

B. Warranty: Cover complete system for failure to meet specified requirements.

1.07 COORDINATION. Manufacturer shall be responsible for details and dimensions not controlled by job conditions and shall show on his shop drawings required field measurements beyond his control. Coordinate with responsible trades to establish, verify and maintain field dimensions and job conditions.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Kawneer
B. Tube-lite
C. US Aluminum

2.02 MATERIALS

A. Extruded Aluminum: ANSI/ASTM B221; 6063-T5 alloy,temper.

B. Sheet Aluminum: ASTM B209;5005-H16 alloy, temper.

C. Sheet Steel: ANSI/ASTM A446; hot-dipped galvanized.

D. Steel Sections: ANSI/ASTM A36; shapes to suit mullion sections.

E. Primer and Touch-Up Primer for Galvanized Surfaces: FS TT-P-645.

F. Fasteners: compatible with aluminum.

G. Thermal barrier: Two-part, chemical curing, high density polyurethane; mechanically and adhesively bound to the aluminum.

2.03 FRAME. Thermally broken with flush glazing stops and internal weep drainage system. Nominal dimensions 2" x 4.5". Screw spline joinery, center glazed from either interior or exterior, EPDM gaskets in reglets.

2.04 DOORS

A. Wide stile door (5" top rail and vertical stiles, 8" bottom rail).

B. 1-3/4 inches thick; with glazing stops for insulated glazed units.

2.05 GLASS AND GLAZING MATERIALS: Glass and Glazing Materials: As specified in Section 08800.

2.06 HARDWARE

A. Weatherstripping: Polymeric, continuous at head, jamb, sill, and meeting stile.

B. Sill Sweep Strips: Resilient seal type, of neoprene compound.

C. Threshold: Extruded aluminum, one piece per door opening, ribbed surface, similar to Reese S239D.

D. Hinges: Mortised Ball Bearing Butt type, 4-1/2" x 4-1/2". Provide at each leaf. Non-rising pins at exterior.

E. Closer: Heavy duty, meeting the requirements of ADA, with 100 degree hold-open.

F. Exit Device: Vertical rod operation (concealed) with full width bar of rectangular cross section.

G. Lock: Provide cylinder lock, complete with cylinder escutcheon.

H. Pull: Standard pull handle, finish to match door.

I. Push: Standard push plate/paddle, finish to match door.

J. Door Shoe.

2.07 HARDWARE SCHEDULE

A. Exterior Doors - Single Door: 106A

1. Weatherstripping
2. Sill sweep strips
3. Threshold
4. Hinges - 1-1/2 pair
5. Closer
6. Exit device
7. Lock
8. Pull
9. Push

2.08 FABRICATION

A. Fabricate doors and frames allowing for minimum clearances and shim spacing around perimeter of assembly, yet enabling installation.

B. Rigidly fit and secure joints and corners with internal reinforcement, except that door corners will be welded. Make joints and connections flush, hairline, and weatherproof.

C. Develop drainage holes with moisture pattern to exterior.

D. Prepare components to receive anchor devices. Fabricate anchorage items.

E. Arrange fasteners, attachments, and jointing to ensure concealment from view.

F. Prepare components with internal reinforcement for door hardware.

2.09 FINISHES: Extruded Aluminum Surfaces: Manufacturers standard Classic Bronze.

3. EXECUTION

3.01 INSPECTION

A. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this Section.
B. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

A. Install doors, frames, windows, glazing and hardware in accordance with manufacturer's instructions.
B. Use anchorage devices to securely attach frame assembly to structure.
C. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
D. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
E. Install hardware using templates provided.
F. Install glass in accordance with Section 08800, using exterior combination method of glazing.
G. Install perimeter 1 part polyurethane type sealant, backing materials, and installation requirements in accordance with Section 07900.
H. Adjust operating hardware for smooth operation.

3.03 TOLERANCES

A. Variation from Plane: 0.03 inches per foot maximum or 0.25 inches per 30 feet, whichever is less.

B. Misalignment of Two Adjoining Members Abutting in Plane: 0.015 inches.

3.04 CLEANING/REPAIRING/REPLACEMENT

A. Remove protective material from prefinished aluminum surfaces.
B. Wash down exposed surfaces using a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.
D. Replace scratched, cracked, chipped or otherwise damaged glass and framing.

END 08410

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid:
1. **General Contractor** provide finish hardware as indicated on the hardware schedule and specified herein.

1.02 REFERENCES

A. ANSI A117.1 - Specifications for Making Buildings and Facilities Accessible to and Usable by Physically Handicapped People.
B. ANSI/NFPA 80 - Fire Doors and Windows.
C. AWI - Architectural Woodwork Institute.
D. BHMA - Builders' Hardware Manufacturers Association.
E. DHI - Door and Hardware Institute.
F. NAAMM - National Association of Architectural Metal Manufacturers.
G. NFPA 101 - Life Safety Code.
H. SDI - Steel Door Institute.

1.04 COORDINATION: Coordinate work of this Section with other directly affected Sections involving manufacturer of any internal reinforcement for door hardware.

1.05 QUALITY ASSURANCE

A. Manufacturers: Companies specializing in manufacturing door hardware with minimum 3 years experience.
B. Hardware Supplier: Company specializing in supplying commercial door hardware with 2 years experience, with AHC designation.
C. Hardware Installer: Employ a qualified carpentry person to perform the work of this Section.
D. Manufacturers: Items of manufacturers other than those scheduled will be acceptable for substitution provided they meet the quality standards of this Specification for finish, function and grade. For the purpose of establishing quality standards and design, only one manufacturer of each type of hardware has been scheduled.

1.06 SUBMITTALS

A. Submit schedule, shop drawings, and product data under provisions of Section 01340.
B. Indicate locations and mounting heights of each type of hardware.
C. Provide product data on specified hardware.

1.07 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Section 01730.
B. Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Store and protect products under provisions of Section 01620.
B. Package hardware items individually; label and identify package with door opening code to match hardware schedule.
C. Deliver permanent keys to Owner direct from hardware supplier.

D. Protect hardware from theft by cataloging and storing in secure area.

1.09 MAINTENANCE MATERIALS

A. Provide special wrenches and tools applicable to each different or special hardware component.
B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

2. PRODUCTS

2.01 GENERAL

A. Fasteners: Hardware shall be complete with all necessary screws, bolts, anchors or other fasteners for proper application. Such fasteners shall be of suitable size and type, and shall harmonize with hardware as to materials and finish.
B. Door Closers: Closers shall not be installed on the outside of any exterior door. Whenever it is necessary to install a closer on the side of the door away from the butts, a parallel arm shall be used. Corner of soffit brackets are not permitted unless no other method of installation is possible. All closers shall be fastened with through bolts and grommet nuts.

2.02 KEYING. Furnish 2 key blanks for each lock specified plus ten additional blanks to be used as master keys.

2.03 FINISHES: All hardware to be (BHMA 630) Stain Stainless Steel, except as noted.

2.04 HINGES

A. Description:
1. 4-1/2" x 4-1/2" at doors not more than 36" wide
2. 5" x 4-1/2" at doors more than 36" wide.
3. Non-removable pins at exterior locations

B. Acceptable Manufacturers:
1. Type 1 (ball bearing) at doors with closers:
a. Hager BB1279
b. Stanley FBB179
2. Type 2 (non-ball bearing) at doors without closers
a. Hager 1279
b. Stanley F179
3. Type 3 (ball-bearing) heavy weight hinges
a. Hager BB1168
b. Stanley FBB168

2.05 CLOSER

A. Description: Unless called out to be otherwise, mount on face of door on push side; with hold-open and delayed action features.

B. Acceptable manufacturers
1. Norton 7500
2. LCN 4041
3. Corbin Russwin DC2200/DC2210

2.06 LOCK/LATCH

A. Description:
1. Handicapped accessible lever design
2. 2-3/4" backset typical.

B. Acceptable Manufacturers:

1. Passage Function: Mortise (Non-keyed)
   a. Corbin Russwin - #ML2010 (ANSI F01)
   b. Sargent - 8200 Series - #15 Passage (ANSI F01)
   c. Schlage - #L9010 (ANSI F01)

2. Office Function: Mortise (Keyed)
   a. Corbin Russwin - #ML2051 (ANSI F04)
   b. Sargent - 8200 Series - #55 Office (ANSI F04)
   c. Schlage - #L9050 (ANSI F04)

3. Storeroom Function: Mortise (Keyed)
   a. Corbin Russwin - #ML2057 (ANSI F07)
   b. Sargent - 8200 Series - #4 Storeroom (ANSI F07)
   c. Schlage - #L9080 (ANSI F07)

4. Exterior Door: Rim Exit Device (Keyed)
   a. Corbin Russwin - #ED 4200 (Classroom Function) (ANSI 06)
   b. Sargent - 8500 Series - #13 (ANSI 08)
   c. Schlage - 25-R Series 25-R-L

C. Lever Design
   1. Corbin Russwin - Newport
   2. Sargent - “L” Lever
   3. Schlage - Standard Levers “06"

2.07 KICKPLATES

A. Construction:
   1. 10" high x width of door
   2. .050", 18 ga.
   3. Place on kick side of scheduled doors
   4. Finish - US32D

B. Acceptable Manufacturers:
   1. Hager - 190S CSK

2.08 WALL STOP

A. Description:
   1. Wall type bumper
   2. Cast aluminum construction with convex rubber insert
   3. Tamperproof mounting
   4. Mount with toggle bolts at hollow walls, with expansion shields at masonry or concrete walls.
   5. Finish US32D

B. Acceptable Manufacturers:
   1. Hager - 232W
   2. Ives - WS406

2.09 THRESHOLD

A. ADA Compliant aluminum threshold with vinyl bumper seal, ½" maximum overall height, widths and lengths to fit specific opening conditions.

B. Acceptable Manufacturers
   1. National Guard Products, Inc.

2. Hager
3. Pemko

2.10 WEATHERSTRIPPING

A. Description:
1. Clear anodized aluminum retainer
2. Flexible vinyl bulb
3. Run continuous at both jambs and head (cope at closer).

B. Acceptable manufacturers:
1. Reese - DS75C
2. Hager - 896S

2.11 DOOR BOTTOM

A. Description:
1. Clear anodized aluminum extrusion
2. Finned cold weather vinyl bulb
3. With integral drip
4. Make continuous along bottom of scheduled doors

B. Acceptable manufacturers:
1. Pemko - 216V
2. Hager - 783S

2.12 RAIN CAP

A. Description:
1. Anodized aluminum extrusion.
2. Mount to door frame immediately above door.

B. Acceptable Manufacturers:
1. Pemko - 346
2. Reese - R201D

2.13 FLUSH BOLT

A. Slide Flush Bolt

B. Acceptable Manufacturers
1. Hager - 281D
2. Ives - 261

2.14 METAL ASTRAGALS

A. Steel doors - “Z” shaped metal astragals

B. Acceptable Manufacturers
1. National Guard Products, Inc. - 570

3. EXECUTION

3.01 INSPECTION

A. Verify doors & frames are ready to receive work & dimensions are as instructed by the manufacturer.

B. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and requirements of SDI, ANSI/NFPA 80, BHMA and DHI.
B. Use the templates provided by hardware item manufacturer.
C. Mount locksets 40-1/4" (from finished floor to center line of lock)
D. Conform to ANSI A117.1 for positioning requirements for the handicapped.
E. All butts, locks, plates, etc., shall be neatly and accurately mortised flush, properly place and accurately aligned for smooth and quiet operation without sticking, binding, hanging, or rattling. All doors shall be hung with equal clearance at jambs and heads. Adjust all hardware properly and leave in smooth operating condition.

END 08700

1. GENERAL

1.01 WORK INCLUDED

A. Base Bid: Contractor provide:
1. Glass and glazing for doors, windows, sidelights and borrowed lights
2. Glass for unframed mirrors.
3. Glass and glazing for aluminum frames as shown on drawings.

1.02 REFERENCES

A. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Material Used in Buildings.

B. ASTM E84 - Surface Burning Characteristics of Building Materials.

C. FS DD-G-451 - Glass, Float or Plate, Sheet, Figured (Flat, for Glazing, Mirrors and Other Uses).

D. FS DD-G-1403 - Glass, Plate (Float), Sheet, Figured, and Spandrel (Heat Strengthened and Fully Tempered).

E. FS TT-G-410 - Glazing Compound, Sash (Metal) for Back Bedding and Face Glazing (Not for Channel or Stop Glazing).

F. FS TT-S-227 - Sealer Compound: Rubber Base, Two Component (for Calking, Sealing and Glazing in Building Construction).

G. FS TT-S-230 - Sealing Compound: Synthetic Rubber Base, Single Component, Chemically Curing for Calking, Sealing & Glazing in Building Construction.

H. FS TT-S-1543 - Sealing Compound: Silicone Rubber Base (for Calking, Sealing, and Glazing in Buildings and Other Structures).

I. FS TT-S-001657 - Sealing Compound: Single Component, Butyl Rubber Based Solvent Release Type (for Buildings and Other Types of Construction).

J. SIGMA No. 64-7-2 - Specification for Sealed Insulating Glass Units.

1.03 QUALITY ASSURANCE: Conform to Flat Glass Marketing Association (FGMA) Glazing Manual and Glazing Sealing Systems Manual for glazing installation methods.

1.04 SUBMITTALS

A. Submit product data under provisions of Section 01300.

B. Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

C. Provide data on glazing sealant. Identify colors available.

1.05 DELIVERY, STORAGE, AND PROTECTION

A. Deliver products to site under provisions of Section 01600.

B. Store and protect products under provisions of Section 01600.

1.06 WARRANTY

A. Provide 5 year manufacturer's warranty for mirrors and 10 years for sealed units, under provisions of Section 01700.

B. Warranty: Include coverage of sealed glass units from seal failure, interpane dusting or misting, and replacement of same.

2. PRODUCTS

2.01 ACCEPTABLE GLASS MANUFACTURERS

A. P.P.G.
B. L.O.F.
C. Globe Amerada Glass Co.
D. Noviflex
E. Guardian Industries.
F. Glasstemp

2.02 GENERAL

A. Tempered glass lights as required by code and as recommended by manufacturer complying with FS DD-G-1403 and ANSI Z97.1.

B. Temper units without tong marks.

2.03 GLASS MATERIALS

A. Typical windows: 1" thick insulated units consisting of 1/4" tinted, ½" air space and 1/4" clear. Performance as listed below:

1.	Transmittance		
	a.	UV	6%
	b.	Visible	12%
	c.	Total solar energy	19%
2.	Reflectance		
	a.	Visible	5%
	b.	Total solar energy	5%
3.	U Value		
	a.	Winter/night	0.47
	b.	Summer/day	0.50
4.	Shading coefficient		0.34

B. Exterior Doors: ¼" inch tinted, tempered. Performance as shown below:

1.	Transmittance		
	a.	UV	7%
	b.	Visible	14%
	c.	Total solar energy	26%
2.	Reflectance		
	a.	Visible	5%
	b.	Total solar energy	5%
3.	U Value		
	a.	Winter/night	1.02
	b.	Summer/day	0.93
4.	Shading coefficient		0.55

2.04 ACCEPTABLE GLAZING COMPOUND MANUFACTURERS

A. PPG

B. LOF
C. Guardian

2.05 GLAZING COMPOUNDS

A. Glazing Compound: FS TT-G-410; color selected by architect.

B. Butyl Sealant: FS TT-S-001657; Shore A hardness of 10-20; color selected by Architect; non-skinning.

C. Acrylic Sealant: FS TT-S-230, Type II, Class A; single component; cured 2Shore A hardness of 15-25; color selected by Architect.

D. Polysulphide Sealant: FS TT-S-227; Class A, Type 2; two component; cured Shore A hardness of 15-25; color selected by Architect.

E. Silicone Sealant: FS TT-S-1543; Class A; single component; chemical curing; capable of water immersion without loss of properties; cured Shore A hardness of 15-25; color selected by Architect.

2.06 GLAZING ACCESSORIES

A. Setting Blocks: Neoprene; 79-90 Shore A durometer hardness; 4 inch long x 3/8 inch wide x 1/4 high.

B. Spacer Shims: Neoprene; 50 Shore A durometer hardness; 3 inch long x 1/4 inch wide x 1/4 inch thick; self adhesive one face.

C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10-15 Shore A durometer hardness; coiled on release paper; black color.

D. Glazing Splines: Resilient polyvinylchloride extruded shape to suit glazing channel retaining slot;

E. Glazing Clips: Manufacturer's standard type.

3. EXECUTION

3.01 INSPECTION

A. Verify surfaces of glazing channels or recesses are clean, free of obstructions, and ready for work of this Section.

B. Beginning of installation means acceptance of substrate.

3.02 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses.

C. Prime surfaces scheduled to receive sealant.

D. Carefully measure glass openings and provide minimum required tolerances and clearances.

3.03 GENERAL

A. Install in accordance with manufacturers' printed instructions

B. Prevent nicks, abrasions & other damage likely to develop stress on edges.

3.04 EXTERIOR COMBINATION METHOD (TAPE AND SEALANT)

A. Cut glazing tape to length and set against permanent stops, 3/16 inch below sightline. Seal corners by butting tape and dabbing with butyl sealant.

B. Apply heel bed of butyl sealant along exterior void ensuring full contact with pane.

C. Place setting blocks at 1/3 points.

D. Rest glass on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane.

E. Place glazing tape on glass with tape 1/4 inch below sightline.

F. Apply cap bead of sealant along exterior void, to uniform line, flush with sightline. Tool or wipe sealant surface with solvent for smooth finish.

3.05 INTERIOR DRY METHOD (TAPE AND TAPE)

A. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sightline.

B. Place setting blocks at 1/3 points.

C. Rest glass on setting blocks and push against tape for full contact at perimeter of pane.

D. Place glazing tape on free perimeter of pane in same manner described above.

E. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.

F. Knife trim protruding tape.

3.06 CLEANING/PROTECTION

A. After installation, mark pane with an "X" by using plastic tape or removable paste.

B. Clean all surfaces of glazing materials, mortar, plaster, paint and other soiling or contaminates.

C. Remove labels after work is completed.

D. Replace broken, scratched, chipped, or otherwise damaged glass.

END 08800

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide:
1. Metal stud framing system.
2. Metal furring and support systems.
3. Gypsum wall board for walls, bulkheads, soffits and ceilings.
4. Drywall accessories as shown on drawings or required for complete installation.
5. Taping and finishing of drywall.

1.02 REFERENCES

A. ASTM A525 - General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.

B. ANSI/ASTM A591 - Steel Sheet, Cold-Rolled, Electrolytic Zinc-Coated.

C. ASTM C645 - Non-Load (Axial) Bearing Steel Studs, Runners (Track) and Rigid Furring Channels for Screw Application of Gypsum Board.

D. ASTM C 754 - Installation of Steel Framing Members to Receive Screw-Attached Gypsum Wallboard, Backing Board, or Water-Resistant Backing Board.

E. FS TT-P-645 - Primer, Paint, Zinc-Chromate, Alkyd Type.

F. GA 203 - Installation of Screw-Type Steel Framing Members to Receive Gypsum Board.

G. ANSI/ASTM C36 - Gypsum Wallboard.

H. ANSI/ASTM C442 - Gypsum Backing Board.

I. ANSI/ASTM C475 - Joint Treatment Materials

J. ANSI/ASTM C630 - Water Resistant Gypsum Backing Board.

K. ANSI/ASTM C754 - Installation of Framing Members to Receive Screw Attached Gypsum Wallboard, Backing Board, or Water Resistant Backing Board.

L. ANSI/ASTM E90 - Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.

M. ANSI/ASTM E119 - Fire Tests of Building Construction and Materials.
N. GA-201 - Gypsum Board for Walls and Ceilings.

O. GA-216 - Recommended Specs. for Application/Finishing of Gypsum Board.

P. U.S.G. - Gypsum Construction Handbook.

1.03 SYSTEM DESCRIPTION

A. Metal stud framing system for exterior wall infill, with exterior sheathing specified in Section 06100 and insulation specified in Section 07213 and interior gypsum board specified in this section.

B. Metal stud framing system for interior walls, with batt type acoustic insulation specified in Section 07213, and gypsum board specified in this section.

C. Metal stud framing for interior walls finished with ceramic tile.

D. Maximum Allowable Deflection: 1/270 span.

E. Design system to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

F. Gypsym board finish for walls and ceilings as shown or scheduled on the drawings, including taping and finishing in preparation for painting or receiving other finish materials.

1.04 QUALITY ASSURANCE

A. Perform metal framing work in accordance with GA 203 and ASTM C754.

B. Applicator Qualifications: Company specializing in gypsum board systems work with 3 years experience.

C. All gypsum board and accessories shall be of one manufacturer unless noted otherwise.

1.05 COORDINATION. Openings and chases for heating, plumbing and electrical ducts, pipes and conduits shall be built into drywall partitions and ceilings as required. Consult other trades in advance and make provisions for their work to avoid cutting and patching. Coordinate installation of sheathing with cold-formed metal framing erector.

1.06 DELIVERY AND STORAGE. Deliver materials to project site with manufacturer's labels intact and legible. Deliver fire-rated materials bearing testing agency label and required fire classification numbers. Store materials under cover in dry area, off floor. Damaged, deteriorated or wet materials shall be rejected and replaced.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - METAL FRAMING

A. Clark
B. Incor
C. Unimast

2.02 STUD FRAMING MATERIALS

A. Studs: ASTM A525, galvanized to G90, non-load bearing rolled steel, channel shaped, punched for utility access, as follows:

1. Width: as shown on drawings.
2. Thickness: 20 gauge unless otherwise noted.

B. Runners: Of same material and finish as studs, bent leg retainer notched to receive studs.

C. Furring and Bracing Members: Of same material and finish as studs, thickness to suit purpose.

D. Fasteners: in accord with GA 203.

2.03 ACCEPTABLE MANUFACTURERS - GYPSUM BOARD SYSTEM

A. U.S. Gypsum.
B. Georgia-Pacific
C. National Gypsum.

D. Flintkote.

2.04 GYPSUM BOARD MATERIALS. **Provide type "X" gypsum board at all locations.**

A. Standard Gypsum Board: ANSI/ASTM C36; 48 x 5/8 or 1/2 inch thick, maximum permissible length; ends square cut, tapered edges.

B. Fire Rated Gypsum Board: ANSI/ASTM C36; fire resistive type 'X', UL rated; otherwise same as standard gypsum board.

C. Moisture Resistant Gypsum Board: ANSI/ASTM C630; 48 x 5/8 inch thick, otherwise same as standard gypsym board.

D. Glass-Mat, Water-Resistant Backing Board with Water Resistant Coating: ASTM C 1178/C 1178M; Basis of design product: "DensShield Tile Backer" by Georgia-Pacific or a comparable product by another manufacturer; 5/8".

D. Exterior Gypsum Sheathing: Fiberglass faced boards with water-resistant gypsum cores; 48 x 5/8 inch thick, maximum permissable length; ends square cut, tapered edges; rated for exterior installation.

E. High Abuse Gypsum board: Fire resistant gypsum core (type X) encased in abrasion resistant paper (finish side) and heavy liner paper (backside). Capable of taking a being loaded by a steel ball (.438 inches diameter) at a rate of 0.25" per minute and not indent more than 0.1" by a 230 pound load nor indent more than 0.2" by a 460 pound load.

F. Gypsum board in horizontal applications (ceilings, soffits, etc.) shall be listed for such use by the manufacturer.

2.05 ACCESSORIES

A. Corner Beads: Metal, Durabead No. 101, galvanized.

B. Casing Beads: No. 200-B, galvanized.

C. Control Joint: No. 093, galvanized.

D. Joint Materials: ANSI/ASTM C475; perforated reinforcing tape, joint compound, adhesive, water, and fasteners. Materials used on exterior shall be rated for such exposure.

E. Acoustical Sealant and Tape: Non-hardening, non-skinning, for use in conjunction with gypsum board; manufactured by Tremco, Pecora, or USG.

3. EXECUTION

3.01 EXAMINATION

A. Verify that conditions are ready to receive work.

B. Verify field measurements are as shown on Drawings and instructed by the manufacturer of items to be installed in metal stud constructions.

C. Verify that rough-in utilities are in proper location.

D. Beginning of installation means installer accepts existing conditions.

3.02 ERECTION

A. Align and secure top and bottom runners at 16 inches on center. Place one bead of acoustic sealant between runners and substrate.

B. Fit runners under and above openings; secure intermediate studs at spacing of wall studs.

C. Install studs vertically at 16 inches oc. Place one bead of acoustic sealant between studs and adjacent vertical surfaces.

D. Connect studs to tracks.

E. Stud splicing not permissible.

F. Construct corners using minimum three studs.

G. Double studs at wall openings, door and window jambs, and not more than 2 inches each side of openings.

H. Brace stud framing system and make rigid.

I. Coordinate erection of studs with requirements of door and window frame supports and attachments.

J. Align stud web openings.

K. Coordinate installation of bucks, anchors, and blocking with electrical and mechanical work to be placed in or behind stud framing.

L. Blocking: Secure wood blocking to studs. Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, fire extinguisher cabinets, grab bars, etc.

M. Refer to Drawings for indication of partitions extending to ceiling only and for partitions extending through ceiling to structure above. Maintain clearance under structural building members to avoid deflection transfer to studs.

N. Coordinate placement of insulation in multiple stud spaces made inaccessible after stud framing erection.

3.03 GYPSUM BOARD INSTALLATION

A. Install gypsum board in accord with GA 201, 216, and USG Gypsum Construction Handbook

B. Erect board with ends and edges occurring over firm bearing. Stagger end joints to occur at different locations on opposite sides of wall.

C. Erect exterior gypsum sheathing horizontally, with edges butted tight and ends occurring over firm bearing.

D. Abut boards without forcing. Neatly fit ends and edges of boards and make cuts and penetrations so that paper facing and gypsum core are not damaged.

E. Use screws to fasten gypsum board. Stagger fasteners opposite each other on adjacent ends and edges. Space fasteners as recommended in U.S.G., "Gypsum Construction Handbook".

F. Double Layer Applications: Use gypsum backing board for first layer, placed perpendicular to framing or furring members. Use fire rated gypsum backing board for fire rated partitions. Place second layer parallel to first layer. Offset joints of second layer from joints of first layer.

G. Erect exterior gypsum soffit board perpendicular to supports, with staggered end joints over supports.

H. Treat cut edges and holes in moisture resistant gypsum board and exterior gypsum ceiling board with sealant.

I. Place control joints at changes in backup material, at maximum 20'-0" o.c. in exterior walls; and at maximum 30'-0" o.c. at interior partitions. In ceilings, install at maximum 30'-0" o.c. each way. Provide fire resistant protections behind control joints in fire rated assemblies. longest practical length. Place edge trim where gypsum board abuts dissimilar materials.

J. On fire rated assemblies, seal all penetrations and make air-tight.

K. Thicken partitions to eliminate wall surface jogs for the full length of the wall within a room to conceal structural members, pipes, panels, specialty items, and accessories.

L. Coordinate door and other frame thicknesses as required.

3.04 JOINT TREATMENT

A. Tape, fill, and sand exposed joints, edges, and corners to produce surface ready to receive finishes. The intent of this paragraph is to provide the highest quality of joint treatment work consistent with commercial construction. Texturing work prior to painting will be very light. Leave surfaces smooth, uniform, and free of fins, depressions, ridges, cracks, and other imperfections.

B. Feather coats onto adjoining surfaces so that camber is maximum 1/32 inch.

C. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile.

D. Tape all joints in fire rated partitions and wrapping where concealed from view.

3.05 TOLERANCES. Maximum Variation from True Flatness: 1/8 inch in 10 feet in any direction.

END 09260

1. GENERAL

1.01 WORK INCLUDES

A. Ceramic tile, tile installation materials and accessories as indicated on drawings, as specified herein, or as needed for a complete and proper installation.

B. Section Includes:
1. Ceramic wall tile and trim units (glazed);
2. Porcelain floor tile;
3. Installation products - adhesives, mortars, grouts, and sealants;
4. Waterproofing membranes for Ceramic tile work;
5. Ant-fracture membranes for Ceramic tile work;
6. Backer boards and other accessories.

1.02 REFERENCES

A. ANSI A108.1 - A108.17 American National Standards Institute Specifications for the Installation of Ceramic Tile
B. ANSI A118.4 - Latex-Portland Cement Mortar.
C. ANSI A118.10 - Load bearing, Bonded, Waterproof Membranes for Thinset Ceramic Tile and Dimensional Stone.
D. ANSI A137.1 American National Standards Institute Specifications for Ceramic Tile.
E. ASTM C1028 - Standard Test Method for Determining the Static Coefficient of Friction on Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull Meter Method.
F. Tile Council of North America (TCNA): TCA Handbook for Ceramic Tile Installation, 2007.

1.03 QUALITY ASSURANCE

A. Obtain tile from a single source with the resources to provide products of consistent quality in appearance and physical properties.
B. Obtain installation materials from a single source manufacturer to insure consistent quality and full compatability.
C. Employ an installer who specializes in the installation of ceramic tile, mosaics, pavers, trim units, and thresholds with a minimum of five (5) years documented experience with installations of similar scope, materials, and design.

1.04 SUBMITTALS

A. Verification Samples: Submit the following for each tile included in the work:
1. Full size tile and trim shapes, in each type/style/finish/size/color of ceramic tile (indicate number of pieces required).
2. Grout color samples.
3. Sealant color samples or Prefabricated Joint/Transition Strip Samples.

B. Product and Installation Data:
1. Ceramic tile manufacturer's product and technical data indicating compliance with applicable standards.
2. Mortar and grout manufacturer's technical data sheets indicating suitability for the installation specified and compliance with applicable standards.
3. Sealant or prefabricated joint manufacturer's product and technical data.
4. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

1.05 ENVIRONMENTAL

A. Comply with requirements of referenced standards and recommendations of material

manufacturers for environmental conditions before, during and after installation.

B. Vent temporary heaters to the exterior to prevent carbon dioxide damage to ceramic tile, mosaics, pavers, trim, thresholds, as well as adhesives, mortars, grouts, and other installation materials.

C. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.

D. Maintain ambient temperatures of not less than 50°F (10°C) and not more than 90°F (32°C) during tiling and for a minimum of 7 days after completion..

C. Protect adjacent surfaces during progress of the work in this section.

D. Illuminate the work area during installation providing the same level and angle of illumination as will be available for final inspection.

1.07 DELIVERY, STORAGE, AND HANDLING:

A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

10.8 EXTRA MATERIALS:

A. Provide for Owner’s use a minimum of 2% of the primary sizes and colors of the tile specified, boxed and clearly labeled.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Crossville Inc.

2.02 GENERAL REQUIREMENTS

A. Comply with ANSI Standard for Tile Installation Material and current Tile Council of America Handbook for products and materials indicated for setting and grouting.

2.03 TILE

A. Porcelain tile shall be manufactured to specific size and colors as shown on the Drawings. Finish to be Cross-Sheen (UPS).

B. Series: Color Blox as manufactured by Crossville, Inc.

C. Product Test Data:

1. Water Absorption (ASTM C373): ≤0.10%
2. Scratch Resistance (MOH’s Scale): 6
3. Breaking Strength (ASTM C648): ≥ 450 lbs.
4. Bond Strength (ASTM C482): ≥200 psi
5. Coefficient of Friction (ASTM C1028-89): 0.8 dry/ 0.6 wet.
6. Provide matching trim shapes such as bullnose, corners, borders and cove base where shown or called for on the drawings.

2.04 SETTING AND GROUTING MATERIALS

A. Use appropriate installation mortars according to ANSI A118 series or 136.1-1992. Utilize liquid latex additive.

B. Use grout per ANSI A118.3, A118.5, A118.6 or A118.8-1992. Use liquid latex additive.

2.05 EXPANSION JOINTS, CONTROL, CONTRACTION, AND ISOLATION JOINTS:

A. Provide, in accord with the most current TCA Handbook, Method EJ171 and as shown on the drawings.

B. Use sealant complying with ASTM C920 according to Type, Grade, Class and Uses required.

C. Provide marble threshold trim strips, or other edging material where tile terminates at dissimilar finishes as shown or specified.

D. Prefabricated expansion joints can also be used when suitable for installation.

3. EXECUTION

3.01 EXAMINATION

A. Examine substrates where tile will be installed for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile. Verify that substrates for setting tile are well cured, structurally sound, dry, clean, and free from oil or waxy films and curing compounds.

B. Do not proceed with installation until unsatisfactory conditions have been corrected, Commencement of work signifies acceptance of substrate and installation conditions.

3.02 PREPARATION

A. Substrate Preparation: Prepare and clean substrate in accordance with installation standards and manufacturer's instructions, and as follows:

1. Remove protrusions, bumps and ridges by grinding or chipping.
2. Repair, fill, and level cracks, holes, depressions and rough or chipped areas in substrate using patching material recommended by setting materials manufacturer.
3. Concrete slab to have steel trowel or light broom finish when tile is installed by the thin-set method.
4. Insure substrate is within the following tolerances:
   a. Horizontal surfaces (floors) - Maximum variation in substrate shall not exceed 1/8"or 1/4" in ten feet from required plane, depending on substrate.
   b. Vertical surfaces (walls) - Maximum variation in substrate shall not exceed 1/8"or 1/4" in eight feet from the required plane, depending on substrate.

B. Jobsite Blending: When advised, blend tiles before installing in accordance with reference standards to produce an even range and distribution of color and finish.

3.03 INSTALLATION

A. Manufacturers' Instructions: Perform work in compliance with standard accepted installation guidelines, tile manufacturer’s instructions and setting materials manufacturers' instructions.

B. General Installation Standards: Install tile in accordance with ANSI standards and appropriate TCA methods, and written instructions - Thin-set Floor Installations: TCA Method F, Thin-set Wall Installations: TCA Method W243-2K.

C. Jobsite Blending: Blend tiles before installing, in accordance with reference standards, to produce an even range and distribution of color and finish.

D. Installing Tile:

1. Install tile in pattern indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Adjust to minimize tile cutting and to avoid tile less than half size.
2. When possible, smooth cut edges of tile and/or use appropriate cutter or wet saw to produce smooth cuts. Provide straight cuts which align with adjacent materials.
3. Extend tile into recesses and under equipment and fixtures to form a complete covering without interruption.
4. Terminate tile neatly at obstructions, edges, and corners, without disruption of pattern or joint alignment.
5. Provide tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints smooth and even, without voids, cracks, or excess mortar or grout. Maximum joint size 1/4".
6. Mix mortar in strict accordance with manufacturer's recommendations.
7. Apply setting material in accordance with manufacturer's directions and install tile before mortar has started initial cure. Use a notch trowel that will achieve the recommended coverage of mortar after tiles have been installed. Reference standard coverage information and follow manufacturer's recommendations for trowel size when using mortars.
8. Do not spread more material than can be covered within 10 to 15 minutes. If "skinning" occurs, remove mortar and spread fresh material. Spread mortar with notches running in one direction.
9. Place tile in fresh mortar, press, push and pull the tile slightly in to achieve as near 100% coverage and contact of tile with setting material and substrate as possible. The coverage shall be sufficiently distributed to give full support of the tile. Make sure that all corners and edges are well supported with mortar. Leave no hollow corners or edges.
10. Ensure there is a minimum 3/32" of mortar between tile and substrate after proper bedding. Installer must periodically remove sheets or individual tiles to assure proper bond coverage consistent with industry specifications. If coverage is found to be insufficient, use a larger size notch trowel.
11. Use a beating block and hammer or rubber mallet so that faces and edges of individual tiles are flush and level with faces and edges of adjacent tiles, and to reduce slippage.

3.04 Grouting

A. Install grout in accordance with ANSI A108.10, A108.6, A108.8, A108.9-1992 correlating to grout type chosen and manufacturer's recommendations.

B. Mix grout material in strict accordance with manufacturer's directions.

C. Apply grout to produce full, smooth grout joints of uniform width, and free of voids and gaps.

D. Before grouting entire area do a test area to assure there will be no permanent staining or discoloration of the tile. If necessary, precoat exposed surfaces of tile with a grout release or a suitable sealer as recommended by the manufacturer.

E. Cure all setting and grouting materials in accordance with manufacturer's recommendations.

3.05 Cleaning and Protection:

A. If one has been used, remove grout release and clean tile surfaces so they are free of grout residue and foreign matter, in accordance with manufacturer's instructions. If a grout haze or residue remains, use a suitable grout haze remover or cleaner and contact grout manufacturer for recommendations. Flush surface with clean water before and after cleaning. Do not use harsh hydrochloric, muriatic or sulfuric acid or acid-based cleaners to clean glazed tiles or tiles grouted with latex modified grout.

B. When necessary, acceptable tile cleaning acids or heavy cleaning of grouted with portland cement grout shall not be done before 10 days after grouting. Tile and grout shall be soaked with water before cleaning. In the absence of a recommendation from the grout manufacturer, acid cleaning may be done with a saturated solution of phosphoric or sulfamic acid, mixed in accordance with manufacturer's recommendations.

C. After cleaning, provide protective covering and maintain conditions to protect tile work from damage or deterioration. Where tiled surfaces will be subject to equipment or wheel traffic or heavy construction traffic, and during move-in of furniture and equipment, cover protective covering with 1/4" hardboard, plywood or similar material

D. Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

E. Follow manufacturer’s instructions for the care and protection of newly installed tiles.

END 09320

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide all labor, material, tools and equipment necessary for and reasonably incidental to complete the porcelain tile work as shown on the drawings or specifications.

1.02 REFERENCES

A. ANSI A108.3 - Quarry Tile and Paver Tile Installed with Portland Cement Mortar.
B. ANSI A118.1 - Dry-Set Portland Cement Mortar.
C. ANSI A118.3 - Chemical Resistant, Water Cleanable Tile-Setting Epoxy.
D. ANSI A118.4 - Latex-Portland Cement Mortar.

1.03 QUALITY ASSURANCE

A. Conform to ANSI - American National Standard Specifications for the Installation of Ceramic Tile.
B. Conform to ANSI - Recommended Standard Specifications for Ceramic Tile-TCA 137.1.
C. Conform to Federal Specification SST-308b.

1.04 SUBMITTALS

A. Verification Samples: Submit the following for each type, color, size, and finish included in the work.
   1. Full size tile and trim shapes, (indicate number of pieces required).
   2. Grout color samples.
   3. Sealant color samples or Prefabricated Joint/Transition Strip Samples

B. Product and Installation Data:

   1. Porcelain tile manufacturer's product and technical data indicating compliance with applicable standards.
   2. Master Grade Certificates for each type of tile, issued by tile manufacturer and signed by the installer.
   3. Mortar and grout manufacturer's technical data sheets indicating suitability for the installation specified and compliance with applicable standards.
   4. Sealant or prefabricated joint manufacturer's product and technical data.

1.05 ENVIRONMENTAL

A. Comply with requirements of referenced standards and recommendations of material manufacturers for environmental conditions before, during and after installation.

B. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.

C. Maintain minimum and maximum temperature limits as recommended by manufacturers.

D. Protect adjacent surfaces during progress of the work in this section.

E. Illuminate the work area during installation providing the same level and angle of illumination as will be available for final inspection.

1.06 MAINTENANCE DATA

A. Submit maintenance data under provisions of Section 01700.

B. Include cleaning methods, cleaning solutions recommended, stain removal methods, and polishes and waxes recommended.

1.07 DELIVERY, STORAGE, AND HANDLING: Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Crossville Inc.

2.02 GENERAL REQUIREMENTS

A. Comply with ANSI Standard for Tile Installation Material and current Tile Council of America Handbook for products and materials indicated for setting and grouting.

2.03 TILE

A. Porcelain tile shall be manufactured to specific size and colors as shown on the Drawings. Finish to be Cross-Sheen (UPS).

B. Series: Color Blox as manufactured by Crossville, Inc.

C. Product Test Data:

1. Water Absorption (ASTM C373): ≤0.10%
2. Scratch Resistance (MOH's Scale): 6
3. Breaking Strength (ASTM C648): ≥ 450 lbs.
4. Bond Strength (ASTM C482): ≥200 psi
5. Coefficient of Friction (ASTM C1028-89): 0.8 dry/ 0.6 wet.
6. Provide matching trim shapes such as bullnose, corners, borders and cove base where shown or called for on the drawings.

2.04 SETTING AND GROUTING MATERIALS

A. Use appropriate installation mortars according to ANSI A118 series or 136.1-1992. Utilize liquid latex additive.

B. Use grout per ANSI A118.3, A118.5, A118.6 or A118.8-1992. Use liquid latex additive.

2.05 EXPANSION JOINTS, CONTROL, CONTRACTION, AND ISOLATION JOINTS:

A. Provide, in accord with the most current TCA Handbook, Method EJ171 and as shown on the drawings.

B. Use sealant complying with ASTM C920 according to Type, Grade, Class and Uses required.

C. Provide marble threshold trim strips, or other edging material where tile terminates at dissimilar finishes as shown or specified.

D. Prefabricated expansion joints can also be used when suitable for installation.

3. EXECUTION

3.01 EXAMINATION

A. Examine substrates where tile will be installed for compliance with requirements for installation tolerances and other conditions effecting performance of installed tile. Verify that substrates for setting tile are well cured, structurally sound dry, clean, and free from oil or waxy films, and curing compounds.

B. Do not proceed with installation until unsatisfactory conditions have been corrected, Commencement of work signifies acceptance of substrate and installation conditions.

3.02 PREPARATION

A. Substrate Preparation: Prepare and clean substrate in accordance with installation standards and manufacturer's instructions, and as follows:

1. Remove protrusions, bumps and ridges by grinding or chipping.
2. Repair, fill, and level cracks, holes, depressions and rough or chipped areas in substrate using patching material recommended by setting materials manufacturer.
3. Concrete slab to have steel trowel or light broom finish when tile is installed by the thin-set method.
4. Insure substrate is within the following tolerances:
   a. Horizontal surfaces (floors) - Maximum variation in substrate shall not exceed 1/8"or 1/4" in ten feet from required plane, depending on substrate.
   b. Vertical surfaces (walls) - Maximum variation in substrate shall not exceed 1/8"or 1/4" in eight feet from the required plane, depending on substrate.

B. Jobsite Blending: When advised, blend tiles before installing in accordance with reference standards to produce an even range and distribution of color and finish.

3.03 INSTALLATION

A. Manufacturers' Instructions: Perform work in compliance with standard accepted installation guidelines, tile manufacturer’s instructions and setting materials manufacturers' instructions.

B. General Installation Standards: Install tile in accordance with ANSI standards and appropriate TCA methods, and written instructions - Thin-set Floor Installations: TCA Method F, Thin-set Wall Installations: TCA Method W243-2K.

C. Jobsite Blending: Blend tiles before installing, in accordance with reference standards, to produce an even range and distribution of color and finish.

D. Installing Tile:

1. Install tile in pattern indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Adjust to minimize tile cutting and to avoid tile less than half size.
2. When possible, smooth cut edges of tile and/or use appropriate cutter or wet saw to produce smooth cuts. Provide straight cuts which align with adjacent materials.
3. Extend tile into recesses and under equipment and fixtures to form a complete covering without interruption.
4. Terminate tile neatly at obstructions, edges, and corners, without disruption of pattern or joint alignment.
5. Provide tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints smooth and even, without voids, cracks, or excess mortar or grout. Maximum joint size 1/4".
6. Mix mortar in strict accordance with manufacturer's recommendations.
7. Apply setting material in accordance with manufacturer's directions and install tile before mortar has started initial cure. Use a notch trowel that will achieve the recommended coverage of mortar after tiles have been installed. Reference standard coverage information and follow manufacturer's recommendations for trowel size when using

mortars.

8. Do not spread more material than can be covered within 10 to 15 minutes. If "skinning" occurs, remove mortar and spread fresh material. Spread mortar with notches running in one direction.
9. Place tile in fresh mortar, press, push and pull the tile slightly in to achieve as near 100% coverage and contact of tile with setting material and substrate as possible. The coverage shall be sufficiently distributed to give full support of the tile. Make sure that all corners and edges are well supported with mortar. Leave no hollow corners or edges.
10. Ensure there is a minimum 3/32" of mortar between tile and substrate after proper bedding. Installer must periodically remove sheets or individual tiles to assure proper bond coverage consistent with industry specifications. If coverage is found to be insufficient, use a larger size notch trowel.
11. Use a beating block and hammer or rubber mallet so that faces and edges of individual tiles are flush and level with faces and edges of adjacent tiles, and to reduce slippage.

3.04 Grouting

A. Install grout in accordance with ANSI A108.10, A108.6, A108.8, A108.9-1992 correlating to grout type chosen and manufacturer's recommendations.

B. Mix grout material in strict accordance with manufacturer's directions.

C. Apply grout to produce full, smooth grout joints of uniform width, and free of voids and gaps.

D. Before grouting entire area do a test area to assure there will be no permanent staining or discoloration of the tile. If necessary, precoat exposed surfaces of tile with a grout release or a suitable sealer as recommended by the manufacturer.

E. Cure all setting and grouting materials in accordance with manufacturer's recommendations.

3.05 Cleaning and Protection:

A. If one has been used, remove grout release and clean tile surfaces so they are free of grout residue and foreign matter, in accordance with manufacturer's instructions. If a grout haze or residue remains, use a suitable grout haze remover or cleaner and contact grout manufacturer for recommendations. Flush surface with clean water before and after cleaning. Do not use harsh hydrochloric, muriatic or sulfuric acid or acid-based cleaners to clean glazed tiles or tiles grouted with latex modified grout.

B. When necessary, acceptable tile cleaning acids or heavy cleaning of grouted with portland cement grout shall not be done before 10 days after grouting. Tile and grout shall be soaked with water before cleaning. In the absence of a recommendation from the grout manufacturer, acid cleaning may be done with a saturated solution of phosphoric or sulfamic acid, mixed in accordance with manufacturer's recommendations.

C. After cleaning, provide protective covering and maintain conditions to protect tile work from damage or deterioration. Where tiled surfaces will be subject to equipment or wheel traffic or heavy construction traffic, and during move-in of furniture and equipment, cover protective covering with 1/4" hardboard, plywood or similar material

D. Leave finished installation clean and free of cracked, chipped, broken, unbonded, and otherwise defective tile work.

E. Follow manufacturer’s instructions for the care and protection of newly installed tiles.

END 09320

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide:
   1. Suspended metal grid ceiling system, including acoustical panels, perimeter trim and accessories.
   2. Cut openings in tiles for installation of Ventilating and Electrical Contractors' fixtures, devices, etc.

1.02 REFERENCES

A. ASTM C635 - Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
B. ASTM C636 - Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels.
C. ASTM Test Method E84 - Surface Burning Characteristics of Building Materials.
D. UL - Underwriter's Laboratories System Ratings.

1.03 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacture of ceiling suspension system and ceiling tile with ten years minimum experience.
B. Installer: Company with three years minimum experience.

1.04 SUBMITTALS

A. Submit product data and manufacturer's installation instructions under provisions of Section 01300.
B. Provide product data on metal grid system components, and acoustic units.
C. Submit samples under provisions of Section 01300.
D. Samples shall be 8 x 12 inches in size, illustrating material and finish of acoustic units.

1.05 ENVIRONMENTAL REQUIREMENTS: Maintain uniform temperature of minimum 60 degrees F, and humidity of 40 to 60 percent prior to, during, and after installation.

1.06 SEQUENCING/SCHEDULING

A. Do not install acoustical ceilings until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
B. Schedule installation of acoustic units after interior wet work is dry.

1.07 COORDINATION: Coordinate installation with other trades and make provisions for their work to prevent cutting and patching.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - SUSPENSION SYSTEM

A. Chicago Metallic.
B. Donn Metal.
C. National Rolling Mills.

2.02 SUSPENSION SYSTEM MATERIALS

A. Grid: ASTM C635, exposed T; components die cut and interlocking. One hour fire rated assembly in first floor corridor (only).
B. Accessories: Stabilizer bars, clips, splices, edge moldings, and hold down clips required for suspended grid system.

C. Grid Materials: Commercial quality cold rolled steel with galvanized coating. All components die-cut and interlocking.
D. Grid Finish: White color.
E. Support Channels and Hangers: Primed steel; size and type to suit application, to rigidly secure acoustic ceiling system including integral mechanical and electrical components with maximum deflection of 1/360.

2.03 ACCEPTABLE MANUFACTURERS - ACOUSTIC UNITS

A. Armstrong - Cirrus High - NRC - #558
B. U.S. Gypsum “Frost” High - NRC - #489

2.04 ACOUSTIC UNIT - DESCRIPTION

A. Acoustic Panels: Match existing, conforming to the following:

1.	Size:	24 x 24 inches.
2.	Thickness:	7/8 inches.
3.	Composition:	Mineral.
4.	NRC Range:	.70 to .80.
6.	Weight:	1.40
7.	Edge:	Beveled Tegular
8.	Color:	White.
9.	Texture	Fine

2.05 ACCESSORIES. Hanger Wire: Minimum 12 gage, galvanized, self-annealed, mild steel wire.

3. EXECUTION

3.01 INSPECTION

A. Verify that existing conditions are ready to receive work.
B. Verify that layout of hangers will not interfere with other work.
C. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION - LAY-IN PANEL SYSTEM

A. Install system in accordance with ASTM C636, manufacturer's instructions and as supplemented in this Section, to produce a ceiling true to lines and levels, free from warp and soiled or damaged grid or panels.
B. Install system capable of supporting imposed loads to a deflection of 1/360 maximum.
C. Install after major above ceiling work is complete. Coordinate the location of hangers with other work.
D. Do not use rivets where they are exposed to view or where they prevent tiles from setting in the grid system properly.
E. Hang system independent of walls, columns, ducts, pipes and conduit. Hang wires directly from structure (not from bridgeing or roof decks). Locate first hanger 6 inches from wall or bulkhead and space 4'-0" along carrying channel. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
F. 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.
G. Center system on room axis leaving equal border units unless shown otherwise on drawings.
H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability. Support fixture loads by supplementary hangers located within 6 inches of each corner; or support components independently.
I. Do not eccentrically load system, or produce rotation of runners.
J. Install edge molding at intersection of ceiling and vertical surfaces, using longest practical lengths. Miter corners. Provide edge moldings at junctions with other interruptions. Field rabbett panel edges.

Where round obstructions occur, provide preformed closers to match edge molding. Provide prefabricated radiused edge moldings around radiused wall corners.

K. Form expansion joints as detailed. Form to accommodate plus or minus one inch movement. Maintain visual closure.

L. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.

M. Lay directional patterned units one way with pattern parallel to shortest room axis. Fit border neatly against abutting surfaces.

N. Install acoustic units level, in uniform plane, and free from twist, warp and dents.

O. Install hold-down clips to retain panels tight to grid system in entry vestibules and within 20 feet of exterior doors where such door is not surrounded by a vestibule.

3.04 TOLERANCES

A. Variation from Flat and Level Surface: 1/8 inch in 10 ft.

B. Variation from Plumb of Grid Members Caused by Eccentric Loads: Two degrees maximum.

3.05 ADJUSTING AND PATCHING: Replace damaged members of exposed suspension system. Replace ceiling board and tile that is damaged, installed improperly, or shows visible signs of sagging.

3.06 CLEANING: Clean soiled areas of ceiling material with mild soap and water. Replace ceiling board and tile damaged by improper cleaning. Existing grid that is to be re-used shall also be thoroughly cleaned with mild soap and water before new tile is installed.

END 09500

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid:

1. General Contractor provide resilient tile flooring and rubber base where scheduled.

1.02 RELATED WORK

A. Specified elsewhere:

1. 01340 - Shop Drawings, Product Data & Samples

1.03 REFERENCES

A. ASTM E84 - Surface Burning Characteristics of Building Materials.
B. FS L-F-475 - Floor Covering, Vinyl Surface (Tile and Roll), with Backing.
C. FS SS-T-312 - Tile, Floor: Asphalt, Rubber, Vinyl, Vinyl Composition.
D. FS SS-W-40 - Wall Base: Rubber and Vinyl Plastic.

1.04 REGULATORY REQUIREMENTS: Conform to applicable building code for flame/ fuel/smoke rating requirements in accordance with ASTM E84.

1.05 SUBMITTALS

A. Submit shop drawings, samples, manufacturer's installation instructions and product data under provisions of Section 01340.
B. Submit two samples 2 x 2 inches in size, illustrating color and pattern for each floor material specified.
C. Submit two samples of each color base and nosing and material as well reducer strips for each color specified. Color will be selected by Architect during submittal period.

1.06 OPERATION AND MAINTENANCE DATA

A. Submit cleaning and maintenance data under provisions of 01730.
B. Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Store materials for three days prior to installation in area of installation to achieve temperature stability.
B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

2. PRODUCTS

2.01 MANUFACTURERS - TILE FLOORING

A. Armstrong Imperial Modern.
B. Azrock Premier, Cortina or Custom Cortina.
C. GAF Mini-Chip, Thru-Chip.

2.02 TILE FLOORING MATERIALS: Vinyl Composition Tile: FS SS-T-312, Type IV, Composition 1; 12 x 12 inch size, 1/8 inch thick; marbleized design.

2.03 ACCESSORIES

A. Subfloor Filler: White pre-mix latex; type recommended by flooring material manufacturer.
B. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
C. Edge Strips: Flooring material.
D. Sealer and Wax: Types recommended by flooring manufacturer.
E. Vinyl Reducer: Standard 1 inch wide tapered edging, 3/32 inch thick, color as selected by Architect.

3. EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are smooth and flat with maximum variation of 1/4 inch in 10 ft., and are ready to receive Work.
B. Verify concrete floors are dry to a maximum moisture content of 7 percent, and exhibit negative alkalinity, carbonization, or dusting.
C. Beginning of installation means acceptance of existing substrate and site conditions.

3.02 PREPARATION

A. Remove subfloor ridges and bumps. Fill low spots, cracks, joints, holes, and other defects with subfloor filler.
B. Apply, trowel, and float filler to leave a smooth, flat, hard surface.
C. Prohibit traffic from area until filler is cured.
D. Vacuum clean substrate.
E. Apply primer to surfaces when required by manufacturer.

3.03 INSTALLATION - TILE MATERIAL

A. Install in accordance with manufacturers' instructions.
B. Mix tile from container to ensure shade variations are consistent.
C. Spread only enough adhesive to permit installation of materials before initial set.
D. Set flooring in place, press with heavy roller to attain full adhesion.
E. Lay flooring with joints and seams parallel to building lines to produce minimum number of seams.
F. Install tile to square grid pattern with all joints aligned. with pattern grain parallel for all units and parallel to shortest room dimension. Allow minimum 1/2 full size tile width at room or area perimeter. Lay tile starting at center of room working toward walls, square with room axis. Joints shall be tight butt joints, true to line.
G. Terminate flooring at centerline of door openings where adjacent floor finish is dissimilar.
H. Install edge strips at unprotected or exposed edges, and where flooring terminates.
I. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 PROTECTION: Prohibit traffic on floor finish for 48 hours after installation.

3.05 CLEANING AND WAXING

A. Remove excess adhesive from floor, base, and wall surfaces without damage.
B. Clean, seal, and wax floor surfaces in accordance with manufacturer's instructions. Provide minimum one coat sealer and two coats wax.

END 09650

1. GENERAL

1.01 WORK INCLUDED

A. Base Bid: Contractor provide rubber base where shown or called for on the drawings.

1.02 REFERENCES

A. ASTM E84 - Surface Burning Characteristics of Building Materials.
B. FS L-F-475A - Floor Covering, Vinyl Surface (Tile and Roll), with Backing.
C. FS SS-W-40 - Wall Base: Rubber and Vinyl Plastic.

1.03 REGULATORY REQUIREMENTS: Conform to applicable building code for flame/ fuel/smoke rating requirements in accordance with ASTM E84.

1.04 SUBMITTALS

A. Submit shop drawings, samples, manufacturer's installation instructions and product data.
B. Submit two samples 2 x 2 inches (minimum) in size, illustrating color of materials specified.

1.05 ENVIRONMENTAL REQUIREMENTS

A. Store materials for three days prior to installation in area of installation to achieve temperature stability.
B. Maintain ambient temperature required by adhesive manufacturer three days prior to, during, and 24 hours after installation of materials.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS - BASE

A. Armstrong World Industries
B. Roppe
C. Flexco
D. Johnsonite

2.02 BASE MATERIALS. Provide 1/8 in. thick, 4 in. high wall base with a matte finish, conforming to ASTM F 1861, Type TP - Rubber, Style B – Cove

2.03 ACCESSORIES

A. Primers and Adhesives: Waterproof; types recommended by flooring manufacturer.
B. Sealer and Wax: Types recommended by flooring manufacturer.

3. EXECUTION

3.01 EXAMINATION

A. Examine substrates prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of the base material. Verify that surfaces are smooth and flat with maximum variation of 1/4 inch in 10 ft.
B. **Beginning of installation means acceptance of existing substrate and site conditions.**

3.02 INSTALLATION

A. Apply top set wall base to walls, columns, casework, and other permanent fixtures in areas where top-set base is required. Install base in lengths as long as practical, with inside corners fabricated from

base materials that are mitered or coped. Tightly bond base to vertical substrate with continuous contact at horizontal and vertical surfaces.

B. Scribe and fit to door frames and other interruptions. Install base on cabinets where finished base is not present.

3.05 PROTECTION: Protect installed flooring as recommended by the flooring manufacturer against damage from rolling loads, other trades, or the placement of fixtures and furnishings.

3.06 CLEANING AND WAXING

A. Remove excess adhesive from base, and wall surfaces without damage.

B. **Clean, seal, and wax base surfaces** in accordance with manufacturer's instructions.

END 09655

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide:
1. Complete interior and exterior surface preparation and finishing, including mechanical and electrical equipment.
2. Examine specifications for various other trades and their provisions regarding their painting. Surfaces that are left unfinished by other sections of specifications, shall be painted or finished as a part of this Section.
3. Colors, including deep tones, will be selected by the Architect. Deep tones or accent colors will not exceed 30% of surfaces to be painted. Number of colors to be used on job will be determined by Architect.
4. Painting shall also include all roof top equipment.

B. Only low / no VOC products are to be used.

1.02 RELATED WORK

A. Specified elsewhere:
1. 06200 - Finish Carpentry
2. 08100 - Metal Doors and Frames
3. 08200- Wood Doors
4. 09260 - Gypsum Board Systems

1.03 SURFACES NOT TO RECEIVE FIELD FINISHING

A. Copper, bronze, chromium plate, nickel, stainless steel, Monel metal, lead, lead-coated copper, and weathering steel shall not be painted or finished except as otherwise specified or scheduled. Other surfaces not to be painted include prefinished wall, ceiling, and floor coverings; items with factory applied final finish; plenums above suspended ceilings.

1.04 REFERENCES

A. ANSI/ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

B. ASTM D2016 - Test Method for Moisture Content of Wood.

1.05 DEFINITIONS: Conform to ANSI/ASTM D16 for interpretation of terms used in this Section.

1.06 QUALITY ASSURANCE

A. Product Manufacturer: Company specializing in manufacturing quality paint and finish products with 3 years experience.

B. Applicator: Company specializing in commercial painting and finishing with 2 years experience.

C. Product Labels: Include manufacturer's name, type of paint, stock number, color and label analysis on label of containers.

1.07 SUBMITTALS

A. Submit product data, color selection samples and manufacturer's application instructions under provisions of Section 01300.

B. Provide product data on all finishing products.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Store and protect products under provisions of Section 01600.

B. Deliver products to site in sealed and labeled containers; inspect to verify acceptance.

C. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing.

D. Store paint materials at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F , in well ventilated area, unless required otherwise by manufacturer's instructions.

E. Take precautionary measures to prevent fire hazards and spontaneous combustion.

1.09 ENVIRONMENTAL REQUIREMENTS

A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 45 degrees F for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.

B. Do not apply exterior coatings during rain or snow, or when relative humidity is above 75 percent, unless required otherwise by manufacturer's instructions.

C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

D. Minimum Application Temperature for Varnish and Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft. candles measured mid-height at substrate surface.

1.10 SCAFFOLDS: Provide adequate safe ladders, scaffolds, and stages necessary to complete work.

1.11 PROTECTION: Protect completed finish and paint work, and protect adjacent finish surfaces from paint splatter, spills and stains. Use adequate drop cloths and masking procedures during progress of work.

1.12 PRECAUTIONS

A. Paints, oils, thinners and other flammable items shall be stored outside the building if possible, and whenever necessary to store inside they shall be stored in approved containers when not in actual use during the painting job. The fire hazard shall be kept at a minimum.

B. Precaution shall be taken to protect the public and construction workers during the progress of the work.

C. Fire Extinguishers: Contractor shall furnish a temporary fire extinguisher of suitable chemicals and capacity, located near the flammable materials as described.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. PPG Pittsburgh Paints
B. Sherwin Williams
C. Materials selected for coating systems for each type surface shall be product of a single manufacturer unless otherwise specified. Secondary products such as linseed oil, turpentine and shellacs shall be

first quality products of a reputable manufacturer.

2.02 MATERIALS

A. Coatings: Ready mixed. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.

B. Coatings: Good flow and brushing properties; capable of drying or curing free of streaks or sags.

C. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

2.03 PRODUCTS

A. Metal Primer:

1. PPG “Devguard Alkyd Metal Primer 4160"

B. Metal Finish:

1. PPG “Devflex High Performance Waterborne Semigloss Enamel 4216"

C. Wood Stain:

1. PPG “Olympic Premium Interior Wood Stain”

D, Varnish:

1. PPG “Interior Polyurethane Satin Varnish”

E. Masonry Block Filler:

1. PPG “Concrete Coatings Int/Ext Blockfiller 3010"

F. Gypsum Board & Plaster Primer:

1. PPG “PVA Interior Primer Sealer 1030"

G. Concrete, Masonry Block, Plaster, Gypsum Board Finish, & Plywood:

1. PPG “Ultrahide 150 Interior Eggshell 1410"

3. EXECUTION

3.01 INSPECTION

A. Verify that surfaces and substrate conditions are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report to Architect any condition that may potentially affect proper application.

C. 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. Plaster and Gypsum Wallboard: 12 percent.
2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.

3. Interior Located Wood: 12 percent, measured in accordance with ASTM D2016.
4. Exterior Located Wood: 15 percent, measured in accordance with ASTM D2016.

D. Beginning of installation means acceptance of existing surfaces and substrate.

3.02 PREPARATION

A. Remove electrical plates, hardware, light fixture trim, and fittings prior to preparing surfaces or finishing.
B. Correct minor defects and clean surfaces which affect work of this Section.
C. Shellac and seal marks which may bleed through surface finishes.
D. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
E. Gypsum Board Surfaces: Latex fill minor defects. Spot prime defects after repair.
F. Exterior Wood Scheduled to Receive Paint 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.
G. Wood and Metal Doors Scheduled for Painting: Seal top and bottom edges with primer.

3.03 PROTECTION

A. Protect elements surrounding the work of this Section from damage or disfigurement.
B. Repair damage to other surfaces caused by work of this Section.
C. Furnish drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.
D. Remove empty paint containers from site.

3.04 APPLICATION

A. The intent of these Specifications is to produce the highest quality appearance of paint and finish surfaces. Employ skilled mechanics only. The proper preparation of all surfaces will be strictly enforced and wherever finished surfaces show any defects due to improper preparation, workmanship, etc., the defects shall be removed and the work refinished at the expense of the Contractor.
B. Apply products in accordance with manufacturer's instructions. Final finish costs shall have visual evidence of solid hiding and uniform appearance, and shall be free and smooth of brush marks, streaks, sags, runs, laps, or skipped areas.
C. Do not apply finishes to surfaces that are not dry.
D. Apply each coat to uniform finish and thickness.
E. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
F. Sand lightly between coats to achieve required finish.
G. Allow applied coat to dry before next coat is applied.
H. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

I. Prime back surfaces of interior and exterior woodwork scheduled to be painted with primer paint.
J. Prime back surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.
K. Edges of paint adjoining other materials or colors shall be sharp and clean with no overlapping.
L. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
M. Move electrical plates, hardware, light fixture trim, and fittings prior to finishing.
N. Paint exposed roof ventilators, goose necks, exhaust fans and other items on the roof with 2 coats exterior enamel.

3.05 CLEANING/TOUCH-UP

A. As Work proceeds, promptly remove paint where spilled, splashed, or spattered.
B. During progress of Work maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.
C. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove daily from site.
D. Spot painting will be allowed to correct soiled or damaged paint surfaces only when touch-up spot will blend into surrounding finish and is invisible to normal viewing. Otherwise, re-coat entire section to corners or visible stopping point.

3.06 SCHEDULE OF FINISHES

A. Interior Surfaces:

1. Hollow Metal Doors and door frames:
   a. One prime coat if unprimed; if primed, touch up defects or blemished in prime coat.
   b. Two finish coats.

2. Masonry Block (including that which is above open cell ceilings):
   a. One coat block filler.
   b. Two finish coats.

3. Gypsum Board (including that which is above open cell ceilings):
   a. One prime coat.
   b. Two finish coats.

4. Wood Doors and Wood Trim:
   a. One coat of wood stain.
   b. One coat of gloss varnish.
   c. One coat of satin varnish.

5. Wood Substrates (including that which is above open cell ceilings):
   a. One coat of primer
   b. Two finish coats

6. Electrical Panels which are outside of mechanical/electrical rooms:
   a. Two finish coats.

7. Other ferrous metals:
   a. One prime coat if unprimed; if primed, touch up defects or blemished in prime coat.
   b. Two finish coats.

B. Exterior Surfaces:

1. Metals:
   a. One prime coat if unprimed; if primed, touch up defects or blemished in prime coat.
   b. Two finish coats.

END 09900

1. GENERAL

1.01 WORK INCLUDED

A. Base Bid: Contractor provide high density polyethylene (HDPE) polymer compartment including the following"

1. Floor anchored/overhead braced partitions.
2. Furnish all labor and materials necessary for the completion of work in this section as shown on the contract drawings and specified herein.
3. Work in this section shall include but is not limited to:
   a. Toilet compartments
   b. Hardware for toilet compartments
   c. accessories and anchorage/blocking hardware, etc.

1.02 SUBMITTALS

A. Submit shop drawings and product data under provisions of Section 01300.

B. Clearly indicate partition layouts, swing of doors, elevations, anchorage and mounting details, panel construction, components hardware, finishes and all relevant dimensions.

C. Submit manufacturer's descriptive literature and installation instructions under provisions of Section 01300.

D. Provide samples of textured stainless steel.

1.03 COORDINATION: Coordinate required cut-outs for partition mounted accessories with toilet accessory supplies.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Accurate Partitions Corp
B. Global Partitions.
C. American Sanitary Partition Corporation
D. Global, Inc.
E. Santana Solid Plastic Products

2.02 TYPE: Floor mounted headrail braced type toilet partitions

2.03 MATERIALS

A. Doors, panels, and pilasters shall be 1" thick with homogenous color throughout, constructed of high density polyethylene (HDPE) resins, smooth polished faces and radiused edges.

2.04 CONSTRUCTION

A. Doors, panels, and pilasters shall be 1" thick with uniformly machined edges. A heat sinc shall be attached as standard to the bottom of all doors and panels.

B. Doors and panels shall be 55" high and mounted 14" about the finished floor. A heat sinc shall be attached as standard to the bottom of all doors and panels.

C. Headrail shall be provided to bridge all compartments and brace the end freestanding pilasters to the

wall; the headrail to comprise anodized aluminum with satin finish, contoured to provide anti-grip features.

D. Urinal Screens: 1" thick high density polyethylene resins, smooth faces and radiused edges with attachment to wall only.

2.05 HARDWARE

A. All exposed door hardware shall be of chromium-plated diecast Zamac or bright polished stainless steel and shall be as noted:

1. Heavy Duty wrap around hinge set which permits door to return it pre-set position when not locked. Hinge and slide assembly shall allow emergency access by lifting door from bottom. Hinges shall have nylon bearings and cams, furnish one pair per door.

2. Door hardware shall include a coat hook, bumper, a stop, keeper, and a concealed latch with emergency access.

3. Fasteners shall be of stainless steel; door hinges will be mounted with theft-proof barrel nuts and machine screws; hooks and handles will be mounted with theft-proof, full-thread screws.

4. Provide door pull and latch at handicapped stalls complying with ADA standards.

B. Wall brackets shall be secured to walls with anchoring and/or expansion shields.

C. Pilaster shoes shall be of type 304 stainless steel having a #4 finish.

3. EXECUTION

3.01 PREPARATION

A. Examine site conditions to which work is to be applied. Report discrepancies to Architect in writing.

B. Take site dimensions affecting this work.

C. Ensure correct spacing of plumbing fixtures.

D. Ensure correct location or built-in framing, anchorage, and bracing, where required.

3.02 INSTALLATION

A. Install partitions secure, plumb, level, and square. No evidence of drilling, cutting or patching shall be evident in the finish work.

B. Anchor panels and pilasters together for a rigid installation, with approximately ½" between panels and not more than 3/4" between panels and walls.

a. Anchors into walls shall be capable of developing FULL strength of brackets without pulling out from wall.
b. No plastic expansion anchors will be allowed.

C. Attach panel brackets securely to walls using anchor devices.

D. Attach panels and pilasters to bracket with through sleeve tamperproof bolts and nuts. Locate headrail joints at pilaster center lines.

E. Equip each door with hinges, one door latch, and bumper. Install one coat hook on the back of each door, in center of door, at heights approved on the shop drawings. At handicapped stalls, hook shall be 48" above floor.

F. Install door strike/keeper with outside emergency release function and door bumpers on each pilaster in alignment with door latch.

G. Adjust and align hardware to uniform clearance at vertical edges of doors not exceeding 3/16 inch.

H. Adjust hinges to locate doors in partial open position when unlatched, except that out-swing doors shall return to closed position.

3.03 CLEANING

A. Protect units after erection so that there is no evidence of use or damage at time of acceptance. Damaged, scratched or marred defective materials will be rejected, and shall be replaced with new materials.

B. Clean exposed surfaces of partitions, hardware, fittings, and accessories, including any marks made on the walls and partitions to establish alignment.

C. Damage to floor and wall finishes shall be repaired, touched up, or replaced to the satisfaction of the A/E.

END 10160

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide all identification devices and accessories shown on drawings, specified and required for complete and proper installation.

1.02 QUALITY ASSURANCE. Acceptable Manufacturers: Not less than 5 years experience in manufacture of identifying devices of type specified for the project.

1.03 SUBMITTALS. In accord with 01300:

A. Shop drawings showing details of anchoring and anchor sizes for metal signs.
B. Manufacturer's color charts and alphabet styles for selection.
C. Sample of signs.

1.05 DELIVERY, STORAGE, AND HANDLING. In accord with 01600.

1.06 CODES AND STANDARDS. Identifying signs shall conform in size, format and mounting location to "State of Illinois" Accessibility Standards illustrated and the Federal "Americans with Disabilities Act".

2. PRODUCTS

2.01 INTERIOR SIGNS: ACCEPTABLE MANUFACTURERS

A. Andco Industries Corporation; 4019 Viewmont Drive; Greensboro, NC 27406-9522; (800) 334-9650.
B. Best Sign Systems; 3214 Troost; Kansas City, MO 64109;(816) 531-6611.
C. Nelson-Harkins; 5301 North Kedzie Avenue; Chicago, IL 60625; (312) 478-6243.

2.02 INTERIOR SIGNS

A. Identification Signs: (see drawings)
   1. Material: Equal to Best “MP” plastic signs.
   2. Size: As shown on drawings
   3. Letters: Type: As shown on drawings; Style: Helvetica medium; Braille Characters: Per ADA
   4. Color: White letters on manufacturer's standard dark color background with matte finish.

2.03 EXTERIOR LETTERS: ACCEPTABLE MANUFACTURERS

A. A.R.K. Ramos Architectural Signage Systems, 1321 S. Walker, Oklahoma City, OK, (405-235-5505)
B. GPP-Charleston Industries, LLC, 1005 Toone Road, Elk Grove Village, IL 6007 (800-722-0209)
C. Substitutions: Only in accordance with Section 01600

2.04 EXTERIOR LETTERS

A. The project includes cast letters as described below to be installed by the contractor.
B. Lettering supplier shall provide full size mounting template showing hole location of mounting brackets.
C. Exterior Signage:
   1. Material: Cast Aluminum with welded mounting studs
   2. Size: 4", 6", 8", 10", and12" high letters
   3. Letters: Type as shown on drawings

2.05 CAST PLAQUE

A. The project includes a cast plague to be installed by the contractor with actual lettering to be

determined by Owner.

B. See drawings for Plaque detail

3. EXECUTION

3.01 INSPECTION

A. Check areas to receive signage for conditions that would affect quality and execution of work.
B. Commence installation when all checks have been made.
C. Start of work constitutes acceptance of job conditions.

3.02 INSTALLATION

A. Install in accordance with manufacturer's printed instructions and where directed by A/E.
B. Identifying devices shall be plumb and level.

3.03 CLEANING. Clean to original finish after installation.

4. Schedule: See Schedule immediately following this section.

END 10400

1. GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Heavy duty metal locker units with hinged doors.
   2. Sloped tops.

1.02 SUBMITTALS

A. Section 01330 - Submittal Procedures: Procedures for submittals.
   1. Product Data: Data on locker types, sizes, and accessories.
   2. Shop Drawings: Indicate layout, dimensions, details of fabrication and installation. Include plans, elevations, sections, and attachments to other Work.
   3. Assurance/Control Submittals:
      a. Certificates: Manufacturer's certificate that Products meet or exceed specified requirements.
      b. Manufacturer's Instructions: Indicate component installation assembly, and installation instructions.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Section 01600 - Product Requirements: Transport, handle, store, and protect Products.

B. Deliver materials to project site in manufacturer's original unopened protective packaging.

C. Identify contents, manufacturer, brand name, thermal values, and applicable standards.

D. Store materials in area protected from weather and construction operations.

E. Protect Work from damaged during transportation, storage at Project Site, and throughout tenure of work. Protect adjacent Work and materials from damage during progress of specified Work. Damaged Work shall be repaired or replaced at no additional cost to the Owner. Furnish receipts of all loose or detachable parts.

2. PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with project requirements, manufacturer's offering. Products which may be incorporated in the Work include the following:
   1. Lyon Workspace Products
   2. ASI Storage Solutions
   3. Republic Storage Systems, LLC

B. Section 01600 - Product Requirements: Product options and substitutions. Substitutions: Permitted.

2.02 MATERIALS - LOCKERS

A. Type: Single Tier lockers with sloped tops.

B. Locker Size: 12 inches wide by 12 inches deep by 72 inches high per opening

C. Material. Sheet Steel: ASTM A 1008, Class I, mild annealed, cold rolled steel, free from surface imperfections. Bolts: Zinc plated or other comparable rust-retardant treatment.

D. Body: 16-gauge steel except backs may be 18-gauge steel.

E. Door Frame: 16-gauge formed steel channel. Corners: Lapped and welded into rigid assembly

F. Doors:
1. 1-piece, 14-gauge steel. Both vertical edges formed into channel-shaped formation. Top and bottom flanged at 90-degree angle.

G. Ventilation: Six 6-inch louvers top and bottom

H. Hinges
1. Height: Minimum of 2 inches.
2. Type: 0.050 inch thick steel, 5 knuckle with spun over pin ends.
3. 3 hinges per door.
4. Mounting: Right-hand side of door.

I. Handles:
1. Chrome plated, die cast zinc alloy
2. No moving parts shall operate against outside surface of locker.

J. Shelves:
1. One shelf, approximately 9 inches below top.
2. Single sheet, 16-gauge steel.
3. Safety front edge.

K. Coat Hooks: One double-prong ceiling hook and three single-prong wall hooks.

2.03 ACCESSORIES

A. Number Plates:
1. Aluminum
2. Clearly etched numbers a minimum of 3/8 inch high.
3. Attach in prepunched holes near top of doors.

B. Locks: Combination padlocks to be provided by others.

C. Tops: Continuous-sloping hoods.

D. Bottoms: Painted galvanealed steel, 16 gauge.

E. Closures and Fillers:
1. Top closures, closure strips, front expansion fillers, and corner fillers.
2 Fill spaces between lockers and walls as required.

2.04 LOCKERS - ADA Compliant

A. General: Provide ADA compliant lockers at locations shown on the drawings (total of seven locations).
1. Meet all requirements of the Americans with Disabilities Act for accessibility and usability.
2. Must employ one touch access ADA compliant locks.

2.05 FINISH

A. General: Factory applied finish in accordance with manufacturer's instructions.

B. Standard Finish: Exposed steel parts shall be throughly cleaned, given bonding and rust-inhibitive phosphate treatment, and electrostatically sprayed with powder coat. Baked-on finish.

C. Color: As selected by the A/E from manufacturer's standard color chart.

3. EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.
B. Verification of Conditions: Verify that field measurements, surfaces, substrates and conditions are as required, and ready to receive Work.
C. Report in writing to A/E prevailing conditions that will adversely affect satisfactory execution of the Work of this Section. Do not proceed with Work until unsatisfactory conditions have been corrected.
D. By beginning Work, Contractor accepts conditions and assumes responsibility for correcting unsuitable conditions encountered at no additional cost to the Owner.

3.02 PREPARATION. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication of special components, when possible, to ensure proper fitting of work. However, allow for adjustment and fitting of trim and filler panels whenever taking of field measurements before fabrication might delay Work.

3.03 INSTALLATION

A. Install metal lockers at locations indicated on Drawings in accordance with manufacturer's published instructions.
B. Install lockers plumb, level, rigid, and flush.
C. Anchor lockers to floors and walls as indicated on the drawings.
C. Install trim where indicated, use concealed fasteners to provide flush, hairline joints with adjacent surfaces.
D. Attach number plates to the face of doors with 2 aluminum rivets.
E. Repair minor damages to finish in accordance with the manufacturer’s instructions and as approved by the A/E.

3.04 FIELD QUALITY CONTROL

A. Section 01450 - Quality Control: Field testing and inspection.
B. Inspect installation of lockers, attachment, and alignment with adjacent finishes.
C. Operate locker doors and locking devices.

3.05 ADJUSTING AND CLEANING

A. Adjust doors and latches to operate easily without binding. Verify that integral locking devices are operating properly.
B. Clean surfaces promptly after installation in accordance with manufacturer’s instructions. Do not use harsh cleaning materials or methods that could damage the finish.

3.06 PROTECTION. Protect installed lockers from damage during construction.

END 10500.

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide fire extinguisher and fire extinguisher cabinet where shown on drawings.

B. Alternate Bid No. 1: Contractor provide fire extinguisher and wall mounting bracket where shown on drawings.

1.02 REFERENCES: NFPA 10 - Portable Fire Extinguishers.

1.03 QUALITY ASSURANCE: Conform to NFPA 10 requirements for extinguishers.

1.04 SUBMITTALS: in accord with 01300: Provide shop drawings, product data and manufacturer's installation instructions. Information shall include physical dimensions, operational features, color and finish, anchorage details, rough-in measurements, location, and details.

1.05 OPERATION AND MAINTENANCE DATA

A. Submit manufacturer's operation and maintenance data under provisions of Section 01700.

B. Include test, refill or recharge schedules, procedures, and recertification requirements.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

A. J. L. Industries
B. Larsens
C. Potter Rosemer

2.02 EXTINGUISHER: Dry Chemical Type, 10 pound capacity, with pressure gauge, UL rating: 4A 60BC

2.03 FIRE EXTINGUISHER CABINET: Fully recessed, with flat trim. Fired rated tub (size 24" high x 10.5 inches wide x 6 inches deep). Satin stainless steel finish, Full view door glazed with 1/4" thick tempered glass.

A. J.L. Industries “Ambassador” series
B. Larsen “Architectural” series
C. Potter Roemer “Alta” series

3. EXECUTION

3.01 INSPECTION: Verify rough openings for cabinet are correctly sized and located. Beginning of installation means acceptance of existing conditions.

3.02 INSTALLATION: Install cabinets plumb and level in wall openings 48 inches from finished floor to center line and in accord with the manufacturer's instructions.

END 10522

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide toilet accessories listed herein, complete with attachment hardware.

1.02 REFERENCES

A. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.

B. ASTM A366 - Cold-Rolled Carbon Steel Sheets, Commercial Quality.

1.03 SUBMITTALS

A. Submit manufacturers product data under provisions of Section 01300.

B. Data to illustrate each accessory at large scale and show installation method.

C. Submit manufacturer's installation instructions under provisions of Section 01300.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver accessories to site until rooms in which they are to be installed are ready to receive them.

B. Pack accessories individually in a manner to protect accessory and its finish.

1.06 PROTECTION: Protect adjacent or adjoining finished surfaces and work from damage during installation of work of this Section.

1.07 COORDINATION: Coordinate installation details of items being installed on toilet partitions with partition manufacturer. Supply installation and rough-in data in sufficient time to be built-in to other work.

2. PRODUCTS - See schedule on drawings.

3. EXECUTION

3.01 PREPARATION

A. Deliver inserts and rough-in frames to jobsite at appropriate time for building-in. Provide templates and rough-in measurements as required.

B. Before starting work notify Architect in writing of any conflicts detrimental to installation or operation of units.

C. Verify with Architect exact location of accessories.

3.02 INSTALLATION

A. Install fixtures using skilled mechanics, accessories and items in accordance with manufacturer's instructions.

B. Install true, plumb, and level, securely and rigidly anchored to substrate.

C. Use tamper proof fasteners. No fiber or rawl type plugs permitted.

D. Locate accessories in order that they do not interfere with door swings or use of fixtures. Install recessed accessories after wall finishes have been completed. Anchor accessories with bolts, plates, and approved type fasteners. Take down any loose items and repair damaged wall surfaces.

3.03 SCHEDULE OF ACCESSORIES (See the drawings.)

END 10800

1. GENERAL

1.01 WORK INCLUDED

A. Base Bid:

1. **General Contractor** provide and install:
   a. (2) Electrically operated four-post vehicle lifts, 40,000 pound lift capacity.
   b. All anchors, electrical and compressed air connections to make a complete installation.

1.02 REFERENCES
A. ANSI/ALI ALCTV-2006
B. ANSI/UL 201

1.03 SYSTEM DESCRIPTION
A. Four-post vehicle lift.
B. 40,000-lb. Lifting capacity.
C. Motor: 208 VAC / 3-Phase.
D. Maximum Wheel Base: 25 feet.
E. Adjustable Rise (floor to runway): 9' to 60".
F. Frame Length: 29'-9".
G. Frame Width: 12'-10".
H. Runway Widths: 24".
I. Non-Skid Runway Surfaces.
J. Adjustable Runway Spacing: 40' to 82".
K. Runway Length: 26'-11".
L. Rear Ramps, Front Wheel Stops.
M. Safety Latches on All Four Legs.
N. Two (2) Sets of Rolling Jacls per Lift (40,000 # Capacity)

1.04 QUALITY ASSURANCE
A. Manufacturer: Company specializing in vehicle lift construction with three years minimum experience.

1.05 SUBMITTALS
A. Submit product data and manufacturer's installation instructions under provisions of Section 01340.
B. Indicate electrical connections, air connections, anchorage methods and spacing, and installation details.

1.06 OPERATION AND MAINTENANCE DATA AND TRAINING
A. Submit operation and maintenance data under provisions of Section 01730.
B. Provide two (2) hours of training in the operation and maintenance of the lift equipment.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS
A. BendPak, Inc. (BendPak HD-40X) 1645 Lemonwood Drive, Santa Paula, CA 93060.
B. Rotary Lift (Rotary 40000HDL) 2700 Lanier Drive, Madison, IN 47250

3. EXECUTION

3.01 INSPECTION
A. Verify that floor slab is ready to receive work.

B. Beginning of installation means acceptance of existing surfaces.
C. Contractor to install equipment in accordance with manufacturer's installation instructions. Contractor to install four (4) each anchor bolts for each post, cast into the floor pour. Use the manufacturer's recommended anchor bolt size and pattern. Contractor to set equipment, make electrical connections, and compressed air connections. Contractor shall secure the services of a manufacturer's representative to start-up the equipment and verify proper operation.

3.02 ADJUSTING AND CLEANING
A. Adjust assembly. Verify that equipment and its safety features are operating correctly.
B. Clean equipment and surrounding area.

END 11140

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide manufactured plastic laminate casework with plastic laminate counter tops as shown and detailed on drawings and specified herein, including:
1. Provide all base and wall cabinets shown.
2. Provide all fillers, scribes, finished ends, finished backs, work surfaces / backsplashes and cutouts required to provide a complete and finished project.
3. Provide pulls for all drawers and doors.

1.02 QUALITY ASSURANCE

A. Manufacturer shall have a minimum of 5 years documented successful experience in the manufacture of casework of the type specified in this section. Furnish evidence of meeting this requirement at the request of the A/E.

B. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible, to ensure proper fitting of work. However, allow for the adjustments and fitting wherever taking of field measurements before fabrication might delay work.

1.03 SUBMITTALS. In accord with 01300:

A. Shop Drawings shall consist of floor plans indicating arrangement and relation to adjacent work and equipment plus complete elevations of casework. Additionally:

1. Fabrication and installation drawings
2. Details, frame type, hardware, anchorage and accessory items.
3. Standard manufacturer's material and trim colors.

B. Product Data

C. Color samples

1.04 DELIVERY, STORAGE, AND HANDLING

A. Protect cabinet and counter tops during transit, delivery, storage and handling to prevent damage, soiling and deterioration.

B. Store cabinets and counter tops at project site in spaces which have ambient conditions similar to those of the final installation. Storage areas shall be kept dry, heated with low relative humidity and away from construction work such as painting, wet work, grinding and similar operations.

1.05 WARRANTY. Casework Manufacturer shall warrant for a period of three years (commencing on the date of substantial completion), the product furnished under this section, to be free from defects in material and workmanship.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Stevens Industries, Inc.; 704 West Main Street; Teutopolis, IL 62467; 217-857-6411
B. Compro; 1100 Crystal Drive; Princeton, MN 55371
C. Mohon International Inc.; 1865 North Market Street; P. O. Box 550; Paris, TN 38242; 901-642-4251

2.02 CORE MATERIALS

A. Particle board with a minimum density of 45 lb/cu ft; M-2 industrial grade, when tested in accordance with ANSI A208.1-93 and/or ASTM D1037-91A.

B. Medium density fiberboard with minimum density of 48 lb./cu ft; MD-21 grade and tested under ANSI 208.2 1994 standards.

C. Industrial hardboard shall be pre-finished, 1/4 inches thick and composed of wood fibers, phenolic resin binders and moisture inhibitors that meet or exceed product standard ANSI/AHA A135.4 1988.

2.03 SURFACE MATERIAL

A. Exposed exteriors shall be permanently thermofused melamine laminate, fused to core using a minimum average pressure of 320 PSI and average 320 degree F. temperature. Thermofused melamine laminate shall meet ALA 1996 specification standards, as tested against the high pressure laminate NEMA LD 3-1995, VGS.028 specification standards. (Warranted for life against delamination.)

B. Exposed doors and drawer fronts shall be permanently thermofused melamine laminate, fused to core using a minimum average pressure of 320 PSI and average 320 degree F. temperature. Thermofused melamine laminate shall meet ALA 1996 specification standards, as tested against the high pressure laminate NEMA LD 3-1995, VGS.028 specification standards. (Warranted for life against delamination.)

C. Exposed interiors shall be permanently thermofused melamine laminate, fused to core using a minimum average pressure of 320 PSI and average 320 degree F. temperature. Thermofused melamine laminate shall meet ALA 1996 specification standards, as tested against the high pressure laminate NEMA LD 3-1995, VGS.028 specification standards. (Warranted for life against delamination.)

D. Semi-exposed and concealed surfaces shall be permanently thermofused melamine laminate or high pressure decorative plastic laminate cabinet liner, 0.020" thickness for balanced construction. Thermofused melamine laminate shall meet the ALA 1996 specifications standards, as tested against the high pressure laminate NEMA LD 3-1995, VGS.028 specification standards.

2.04 EDGINGS

A. Exposed exterior cabinet front edges shall be banded with a contrasting or matching rigid PVC extrusion, 0.020" in thickness, resistant to chip, crack and high impact. Edging shall have a satin finish with a UV cured top coat for additional durability. The 0.020" thick edging shall be applied with waterproof hot melt adhesive.

B. Door and drawer front edges shall be banded with a contrasting or matching rigid PVC extrusion, 3mm (1/8") thickness, resistant to chip, crack and high impact. Edging shall have a satin finish with UV cured top coat for additional durability. The 3mm thick edging shall be applied with waterproof hot melt adhesive, and shaped to provide radiused edges and radiused corners.

C. Adjustable shelves shall be banded with PVC extrusion, resistant to chip, crack, and high impact. Edging shall have a satin finish with a UV cured top coat for additional durability. Edging shall be applied with waterproof hot melt adhesive. 3mm thick PVC edging shall be applied to front edge of adjustable shelf with machined radius.

D. All other interior components, including drawers, shall be banded with a PVC extrusion, 0.020" in thickness, resistant to chip, crack and high impact. Edging shall have a satin finish with a UV cured top coat for additional durability. Edging to be machine applied with waterproof hot melt adhesive.

2.05 COLOR SELECTIONS

A. Exposed cabinet exteriors shall be chosen from thermofused melamine laminate selections as depicted in manufacturer's color selector guide. A minimum of seventy (70) colors and patterns shall be available as standard selection.

B. Exposed doors and drawer fronts shall be chosen from thermofused melamine laminate selections as depicted in manufacturer's color selector guide. A minimum of seventy (70) colors and patterns shall be available as standard selection.

C. Semi-exposed surfaces, including drawer box components, shall be finished in either pearl or grey as selected from casework manufacturer's standard interior color selections.

D. Exposed interior components, including both faces of shelves and interior face of backs to be pearl or grey.

E. Door and drawer front edges shall be chosen from one of twenty-two (22) trim group colors in 3mm thick PVC in contrasting or matching colors as depicted in manufacturer's color guide.

F. Exposed front edge of cabinet, including exposed interior edges, shall be selected from one of seventy (70) trim group colors in 0.020" thick PVC in contrasting or matching colors as depicted in manufacturer's color guide, or commercial match to selected exposed exterior color based on availability.

G. Semi-exposed edges of cabinet components including drawers, shall be either pearl or grey in 0.020" thick PVC.

H. Five knuckle hinges shall be available with black, pearl or chrome epoxy finish.

I. Pulls shall be impact resistant, injection molded pulls in bent wire design, to be available in twenty (20) colors as selected from manufacturer's color selector.

J. Casework of substitute brands with lesser amounts or more restrictive selection requirements will not be considered equal and shall be rejected.

K. Finishes to be laminate manufacturer's matte, suede or equivalent finish as approved by architect. Samples will be reviewed by architect for color, texture and pattern only.

2.06 HARDWARE

A. Hinges shall be fully concealed from view when door is closed and shall permit 165 degree door swing. Hinge crank shall be heavy steel with a concealed, integral self-closing spring mechanism. Hinge boss shall be heavy stamp steel. Nylon inserts shall be provided in the door for positive screw attachment. Hinge attachment to sides of cabinet shall employ special 5mm threaded fasteners for additional strength. Hinges shall have three dimensional adjustment capability. Hinge shall have a lifetime guarantee warranted by the hinge manufacturer. Doors less than 48" in height shall have two (2) hinges each door; doors 48" - 63" in height shall have three (3) hinges each door; all doors greater than 63" in height shall have four (4) hinges each door.

B. Door catches shall be a heavy-duty spring loaded, large diameter (17.5mm - 11/16") roller type catch mounted at bottom edge. All doors over 48" in height shall be provided with roller catch at both top and bottom of door.

C. Catch strike plate shall be injection molded ABS, with an integrally molded engagement ridge. Strike plate shall also provide a wide face bumper insuring a positive door stop.

D. Drawer and slide out shelves shall be suspended with bottom mount, side and bottom attached

nylon roller epoxy coated steel slides to ensure quiet, smooth operation. Lateral stability is achieved thru a special formed captive profile. Slides shall have 100 lb. load rating, with both in and out drawer stop, 3" self close feature and a side adjustment cam allowing 3mm side to side alignment.

E. Drawers specifically noted for full extension file use shall be suspended with bottom mount, side and bottom attached nylon roller epoxy coated steel slides to ensure quiet, smooth operation. Lateral stability is achieved thru a special formed captive profile. Slides shall have 150 lb. load rating, with both in and out drawer stop, and 3" self close feature. File drawer shall include extruded top mounted molded side rails to accept standard hanging file folders.

F. Knee-space, pencil drawers, and keyboard trays, shall be designed to permit under counter or support frame mounting, with 100 lb. nylon roller epoxy coated steel slides.

G. Hanger rods shall be heavy chrome plated tubing. Rod shall securely affixed to cabinet shelves.

H. Tote trays shall be of high impact polystyrene with smooth edges. Each tray to include an identification card holder and shall be suspended from rails securely attached to cabinet verticals.

I. Shelf support clips for 1" thick adjustable shelves shall be injection molded clear polycarbonate. Support clips shall incorporate integral molded lock tabs to retain shelf from tipping or inadvertently being lifted out. Support clip shall have 5mm dia. double pin engagement into precision bored hole pattern in cabinet vertical members. Clips shall have a molded ridge which provide pressure against edge of shelving to maintain positive pin engagement. Clip shall be designed in such a manner to provide means for permanent retention to shelf. Static test load must exceed 200 lb. per clip.

J. Dividers that are 1/4" thick shall be fully adjustable and retained with injection molded clear polycarbonate clip.

K. Locks shall be cylinder type, diecast, with five (5) disc tumbler mechanism. Each lock shall be provided with milled brass key. Master keying shall be available. Cabinets with multiple locks installed shall be keyed alike by room, with each cabinet keyed different unless otherwise specified. Locks shall be Remov-A-Core to give flexibility for different pass key options. Locks shall be provided where indicated on equipment drawings as an option or as part of standard catalog cabinet description.

L. Sliding door track shall be double channel rigid PVC extrusion at both top and bottom of doors. Track shall be available in pearl, black or grey colors.

2.07 COMPONENTS

A. Base, wall and tall cabinet ends shall be 3/4" thick particle board, laminated for balanced construction, surfaced as described in Article 2.03.A and edged as described in Article 2.04.A.

B. Base and tall cabinet tops and bottoms shall be 3/4" thick particle board, laminated for balanced construction, surfaced as described in Article 2.03.C, and edged as described in Article 2.04.A.

C. Wall cabinet top and bottom shall be 1" thick particle board, laminated for balanced construction, surfaced as described in Article 2.03.C and edged as described in Article 2.04.A.

D. Vertical cabinet members shall be 3/4" thick particle board, laminated for balanced construction, surfaced as described in Article 2.03.C and edged as described in Article 2.04.D.

E. Cabinet backs shall be 1/4" thick pre-finished industrial hardboard.

F. Frame rails shall be 3/4" thick x 3 3/4" wide particle board, laminated for balanced construction,

surfaced as described in Article 2.03.C and edged as described in Article 2.04.A.

G. Sub base shall consist of separate panel ladder type construction of front, back and intermediates to form a secure and level platform to which cabinet attaches.

H. Mounting rails shall be 3/4" thick x 3 3/4" wide particle board. Wall cabinets shall have rails positioned at the top and bottom. Tall cabinets shall have rails positioned at the top and intermediate location. Base cabinet shall have rails positioned at the top of unit.

I. Drawers shall be full box design with a separate front. Drawer sides and ends shall be constructed of 5/8" medium density fiberboard with pearl or grey color thermofused melamine laminate and matching PVC top edges. Bottoms shall be 1/4" thick medium density fiberboard, pearl or grey color thermofused melamine laminate.

J. Adjustable shelves shall be 1" thick. Edges of shelf shall be banded as described in Article 2.04.C with a high impact, rigid PVC extrusion, pearl or grey in color.

K. Sliding display doors shall be constructed of 1/4" thick distortion free glazing sheet. Center edge shall be capped with full length aluminum channel. Aluminum channel shall be custom extruded, clear etched and anodized. Full length extruded aluminum channel shall be used on outer edges.

L. Solid hinged doors, sliding doors and drawer fronts shall be 3/4" thick material of balanced construction, surfaced as described in Article 2.03.B and edged as described in Article 2.04.B.

2.08 CONSTRUCTION

A. Cabinet parts shall be accurately machined and precision bored for premium grade quality joinery construction, utilizing automatic machinery to ensure consistent sizing on modular cabinets. Cabinets shall be assembled under controlled case clamp conditions, assuring final cabinet squareness and proper joint compressions.

B. Cabinet ends shall be bored to receive 8mm, industrial grade hardwood laterally fluted dowels with chamfered ends. Cabinet ends shall be prepared to receive adjustable shelf hardware at 32mm (approximately 1 1/4") centers. Door hinges and drawer slides shall be machined drilled to maintain vertical and horizontal alignment of components. Inset grooving with chamfer shall be machined 3/4" from rear edge to accept the 1/4" back. Base and tall units shall have one piece end panels continuous to floor for added load capabilities.

C. Tops and bottoms shall be joined to cabinet ends using a minimum of six (6) dowels at each joint for twenty-four (24) inch deep cabinets and a minimum of four (4) dowels at each joint for twelve (12) inch deep cabinets. All dowels to be industrial grade hardwood, laterally fluted, with chamfered ends and 8mm in diameter. Top of base cabinet will be full depth. Inset grooving with chamfer shall be machined 3/4" from rear edge to accept the 1/4" back.

D. Vertical dividers shall be bored to receive adjustable shelf hardware at 32mm (approximately 1 1/4") centers. Dividers shall be joined to tops and bottoms with 8mm diameter hardwood dowels.

E. Frame rails shall be joined to ends with 8mm diameter hardwood dowels.

F. Two (2) toe kick supports shall be inset from cabinet front and back edges, and doweled into cabinet ends with 8mm hardwood dowels.

G. Mounting rails shall be fully concealed behind backs. Rails shall be 3/4" thick and fastened to cabinet ends with 8mm hardwood dowels. Wall and tall cabinet shall incorporate two mounting rails. Wall cabinets shall have rails positioned at top and bottom. Tall cabinets shall have rails positioned at top and intermediate location. Base units shall have rail positioned in the upper back area.

H. Back panels shall be 1/4" thick and inset 3/4" from rear edge of cabinet. Back shall be glued and continuously trapped in top, bottom and ends of cabinets.

I. Drawer corner joints shall be interlocking dowel pin design. Hardwood dowel pins, 8mm diameter shall be inserted into drawer fronts and backs to fit into machined hole patterns in drawer sides. Bottoms shall be trapped into grooves on all four sides glued and mechanical fastened. Drawers shall be suspended on slides as described in Article 2.06.E.

3. EXECUTION

3.01 INSTALLATION

A. Examine the job site and the conditions under which the work in this section is to be performed, and notify the A/E in writing of any unsatisfactory conditions. Do not proceed with work under this section until unsatisfactory conditions have been corrected in an acceptable manner.

B. Casework, countertops and related materials shall be conditioned to average prevailing humidity condition in installation areas prior to start of work.

C. Install casework and countertops with factory-trained supervision authorized by manufacturer. Casework shall be installed plumb, level, true and straight with no distortions. (Shim as required.) Securely attached to building structure with anchorage devices of appropriate type, size and quantity to meet applicable codes, specifications and safety conditions. Where laminate clad casework and countertops abuts other finished work, scribe and trim to accurate fit.

D. Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by the manufacturer.

E. Repair, or remove and replace defective work as directed upon completion of installation.

F. Clean plastic surfaces, repair minor damage per plastic laminate manufacturer’s recommendations. Replace other damaged parts of units.

G. Protect casework and countertops from damage by other trades until Substantial Completion.

H. Cover casework with 4-mil polyethylene film for protection against soiling and deterioration during remainder of construction period.

I. Install sinks level and plumb, as per manufacturers recommendations.

J. Casework manufacturer shall coordinate hole location for plumbing fittings with plumbing contractor.

END 12300

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid:

1. General Contractor Provide:
   a. Pre-engineered metal building systems as shown and herein specified, including framing at porches.
   b. Structural framing and subframing systems.
   c. Sheet metal flashing & trim.
   d. Exterior doors and windows.
   e. Standing seam metal roof.
   f. EPDM roofs on porches.
   g. Preformed metal wall panel.
   h. Overhead doors.
   i. Roof opening curbs.

1.02 SYSTEM DESCRIPTION

A. Building Description:

1. Clear span rigid frame with cross-section as shown on the Drawings.
2. Bay spacing as shown on the Drawings.
3. Roof slope as shown on the drawings

B. Design Specifications:

1. "Metal Building Systems Manual," 2012 edition, Metal Building Manufacturer's Association. (MBMA)
2. "Manual of Steel Construction," 14th edition, American Institute of Steel Construction. (AISC)
3. "Specification for Structural Steel Buildings." 2015 edition (AISC)
4. "Cold-Formed Steel Design Manual," 2008 edition, American Iron and Steel Institute. (AISI)
5. ICC-IAS AC172 or AC472 Accreditation

C. Design Loads:

1. Basic design loads include live, seismic, wind, and dead loads. All other design loads such as mechanical equipment loads (static, dynamic, or kinetic) are classified as auxiliary loads.
2. All loads given are minimum requirements. All applicable provisions of the International Building Code (2006 edition)
3. Basic design loads for wall and roof components are as follows:
   a. Wind speed 90 mph.
   b. Exposure: B, Enclosed.
   c. Snow/Wind Importance factor based upon building usage: 1.15.
   d. Ground snow load = 20 psf.
   e. Seismic Zone loads shall be determined upon Soil Site Class “E”: S_{DS} = 0.453g, S_{D1} = 0.282g, Importance factor 1.50.
   f. MBMA, 2012 edition, application and combination of loads.)

4. Design each member to withstand stresses resulting from a combination of loads that produce the maximum percentage of actual to allowable stress in the member, as prescribed by AISC.

a. Maximum individual member deflection for primary horizontal members shall be L/240, and for vertical members L/180.
b. Maximum individual member deflection for secondary members is L/180.

5. Wind load shall be determined by the following:
   a. The wind on the structure shall be proportioned and applied as horizontal and uplifting forces according to the IBC requirements.

6. Wind loads to masonry walls shall be applied as lateral forces to columns equal to the wind load across the tributary width between columns.

D. Seismic forces from masonry wall systems shall be transferred to the structure as lateral forces at the building columns. Forces from walls shall be determined from wall cross-sections shown on the Drawings, using horizontal force factors for elements of structures as required by the IBC.
   1. Roof components shall comply with U.L. Class 90 wind uplift requirements.
   2. Indicate the basic design load on the Drawings.

1.03 REFERENCES

A. ASTM A-36 - Structural Steel.
B. ASTM A-325 -High Strength Bolts for Structural Steel.
C. ASTM A-446 - Steel Sheet, Zinc-Coated (Galvanized) Structural Quality.
D. ASTM A-463 - Specification Steel Sheet, Cold-Rolled, Aluminum-Coated, Types 1 & 2.
E. ASTM A-475 -Specification for Zinc-Coated Steel Wire Strand.
F. ASTM A-490 -Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints.
G. ASTM A-500 -Cold-Formed Welded and Seamless Carbon Steel Structural Tubing.
H. ASTM A-501 -Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
I. ASTM A-525 -Steel Sheet, Zinc-Coated (Galvanized) by the Hot Dip Process.
J. ASTM A-570 -Specification for Hot-Rolled Carbon Steel Sheet and Strip.
K. ASTM A-572 -High Strength Low Alloy Columbium Vanadium Steel, Structural Quality.
L. ASTM A-607 -Specification for Steel Sheet and Strip, Hot-Rolled and Cold-Rolled.
M. ASTM A-792 -Specification for Steel Sheet, Aluminum-Zinc Alloy Coated.
N. ASTM C-553 -Mineral Fiber Blanket and Felt Insulation.
O. ASTM C-665 -Mineral Fiber Blanket Thermal Insulation for Light Frame Construction.
P. ASTM E-84-Test Method for Surface Burning Characteristics of Building Materials.
Q. ASTM E-96-Test Method of Water Vapor Transmission of Materials.
R. SSPC -Steel Structures Painting Council.
S. TIMA-202-Metal Building Insulation Standard.
T. HH-I-521-Insulation Blanket, Thermal.
U. HH-I-558-Insulation, Blocks, Boards, Blankets, Felts, Covering Thermal.
V. HH-I-1972-Insulation, Board (Thermal).
W. AWS -Structural Welding Code, American Welding Society, D1.1, D1.3.
X. UL 90-Wind Uplift Requirements.
Y. UL 580 - Tests for Uplift Resistance of Roof Assemblies, 1994

1.04 QUALITY ASSURANCE

A. Building System Requirements:
   1. Provide building components manufactured, marketed, or approved by a single specified building manufacturer.
   2. Be, or subcontract erection to, a firm approved or franchised by a specified building manufacturer.
   2. Structural component design to be under the direct supervision of a Registered Structural Engineer, licensed in the State of Illinois.

B. Regulatory Requirements: Building Code: International Building Code (2012 edition).

1.05 SUBMITTALS.

A. Make all submittals in accord with Section 01300.

B. Product Data

C. Report of Force Reactions at Foundations

D. Shop Drawings:
1. Submit only shop drawings that have been reviewed and approved by the building manufacturer's technical representative.
2. Submit 6 copies of complete erection drawings, showing anchor bolt setting, roof, wall, and accessory installation details. Clearly indicate the proper assembly of all building components.
3. Submit a diagram indicating building/column reaction loads to the foundation system for approval, prior to foundation construction.
4. Samples of metal pieces: siding, roofing, trim, gutters, etc. along with color selector charts.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver and store prefabricated components, sheets, panels, and other items so that they will not be damaged, deformed, or stained.

B. Remove all damaged and defective materials from the job site.

1.07 JOB CONDITIONS. This is a new construction, pre-engineered building project for the City of Mattoon, on about 5.75 acres of undeveloped land.

1.08 WARRANTY

A. General Contractor: Provide the following a General Contractor’s warranty for one year in accord with the General Conditions.

B. Building Manufacturer: Provide a warranty which includes ALL of the elements outlined below:

1. The pre-engineered metal building manufacturer warrants to the Owner that it shall at its own expense, make or cause to be made, all repairs or replacements, including all inspections, labor and materials to those items they furnished or approved, to maintain the metal building systems in the condition specified below, and in the applicable portion of Section 13340 of the Project Specifications, for the time periods specified below, following the Date of Substantial Completion of this project.

a. Basic Warranty: Materials & workmanship: One year for all metal building systems.

b. Extended Warranties: Weathertightness: Ten years for the following when they are provided as a part of the building:
(1) Metal or composite flashings.
(2) Standing seam steel roofing.
(3) Metal wall panel system. Insulated metal wall panel system.
(4) Roof opening curbs. Ventilators. Skylights.

c. Extended Warranties: Metal Finish, Roof or Wall Panels: Twenty (20) years **from date of shipment** on fluoropolymer resin paint, or metallurigic coatings, against the following conditions:
(1) Perforation, Peeling, Flaking, Blistering.
(2) Color change in excess of the manufacturer’s published amount (paint).

2. Liability Limits: The building manufacturer's liability for each listed building system shall be limited to the original installed cost for each system, including all labor and materials. The Architect/Engineer shall determine these costs and liability from the General Contractor's Schedule of Values.

3. Manufacturer's Responsibilities: The manufacturer or his representative shall respond within 15 days of written notification by the Owner, of leaks or other defects with an inspection. Replacement and/or repair of defective components or systems covered under the Warranty shall commence within 30 days of the notification date, and shall be made at no cost to the Owner, up to the amount of the manufacturer's liability limit. All inspections made by the manufacturer or his representative under this Warranty will require a written report to the Owner within 30 days of the inspection.

4. Owner's Responsibilities: The Owner will notify the manufacturer if a defect covered by this Warranty is discovered. Notice may be by phone, email, fax, or U.S. Mail, to the manufacturer's office (address to be provided by the manufacturer) within 30 days of discovery.

5. Exclusions:
   a. Damage to the building contents.
   b. Damage resulting from repairs made to the building systems or components without the manufacturer's prior written authorization, except where such repairs are made after the manufacturer fails to honor the terms of this Warranty.
   3. Modifications to any building system or component after Substantial Completion without prior written authorization from the manufacturer.
   4. Damage resulting from any of the following:
      a. Settlement, expansion, contraction, cracking, warping, or movement of non-building systems or components, foundations, or floor slab.
      b. Natural disasters: Windstorms exceeding the testing limits of U.L. 90, hurricane, cyclone, tornado, flood, hail, lightning, or earthquake.
      c. Accidents, vandalism, or other uncontrollable events.
      d. Chemical attack from sources unknown, or not present or foreseeable at the time of the building system installation.
      e. Falling objects, misuse or abuse of a system, or material storage or debris on the roof.
      f. Infiltration of moisture or condensation in, through, or around non-system components, or underlying or surrounding areas, unless caused by defective installation of a warranted system or its components.
      g. Failure of the materials supplied by others, except where such items are specified or advertised by the manufacturer as a part of the building system.
      h. Failure of the Owner to notify the Manufacturer of leaks of other defects within 30 days of discovery.

6. The implied warranties of merchantability and fitness for a particular purpose are excluded.

7. Warranties containing riders or qualifying statements, or any terms other than as herein stated, will not be acceptable to the Owner.

2. PRODUCTS

2.01 MATERIALS

A. All cold-formed structural steel members shall conform to ASTM A-570, Grade 55, milled for structural members.

B. All hot-formed welded and seamless structural steel tubing shall conform to ASTM A-501.

C. All structural steel members shall be galvanized, or shop painted with one coat of primer.

D. Galvanized steel sheet shall conform to ASTM A-446.

E. Aluminum-zinc coated steel sheet shall conform to ASTM A-792.

F. Aluminum coated steel sheet shall conform to ASTM A-463.

G. Diagonal bracing cable shall conform to ASTM A-475, Class A.

H. Wind bracing rod shall be adjustable threaded steel rod, ½" minimum diameter, conforming to ASTM A-36.

I. Structural tubing shall conform to ASTM A-500, Grade B.

J. Bolts shall conform to ASTM A-325.

2.02 ACCEPTABLE MANUFACTURERS

A. The following manufacturers are acceptable, provided they can furnish or approve all components that meet the specification:

1. A & S Building Systems, Inc.
2. American Buildings Co.
3. Behlen Building Systems
4. Butler Manufacturing Co.
5. Chief Buildings
6. Gulf States Manufacturers
7. Inland Buildings
8. Mesco Building Solutions
9. Nucor Building Systems
10. Schulte Building Systems, Inc.
11. Varco-Pruden Buildings

2.03 STRUCTURAL FRAMING COMPONENTS

A. Primary Framing:

1. A frame system that provides the configuration shown on the Drawings.
2. Roof Slope to be as shown on drawigns.
3. Factory weld and shop paint all primary framing components.
4. Factory drilled or punched holes for bolted field assembly.
5. All welded shop connections shall be in accord with AWS "Structural Welding Code," D1.1.

B. Secondary Framing:

1. Purlins, girts, eave struts, end wall beams, flange and sag bracing shall be a minimum of 16 gauge, cold-formed section, shop painted or galvanized.
2. The purlin system shall be capable of supporting the dead load, live load, and all other loads imposed by the attachment of (*ceilings) (*equipment) (*utility lines).

C. End Wall Columns: Factory welded, built-up "I" shape or cold-formed sections of at least 14 gauge steel, with a maximum of L/240 at locations with brick veneer only, or L/180 deflection at painted or galvanized metal siding.

D. Fabrication:

1. Shop fabricate to the indicated size and section, complete with base plates, bearing plates, and other plates for erection, welded in place, and with all holes for anchoring or connections shop drilled or punched to template dimensions.
2. Shop welders shall have passed tests prescribed by the American Welding Society Code

D1.1 and/or D1.3 for process, position, and joint type.

E. Shop Painting:

1. Clean surfaces to be primed of loose mill scale, rust, dirt, oil, grease, and other matter precluding paint bond. Follow, as appropriate, one or more specifications of the Steel Structures Painting Council.
2. Apply one coat of rust inhibitive alkyd zinc chromate, red oxide or waterborne primer, 1.0 mil. dry thickness.
3. Do not paint surfaces that will be welded, or are scheduled to receive spray-on fireproofing.

2.04 STANDING SEAM STEEL ROOFING SYSTEM

A. Standing seam steel roofing panels to be the configuration shown on the Drawings, or as approved by the A/E, and factory fabricated from 24 gauge steel. NOTE: JOB-SITE ROLL-FORMING NOT PERMITTED.

B. The exposed finish shall be 70% fluorocarbon resin paint over Galvalume produced to ASTM A792/A792M-A250, or A255. Color as selected by the A/E from the manufacturer's standard colors. More than one color may be selected.

C. Panels to be interlocking, with non-hardening factory applied seam sealant. Seams to be continuously locked or crimped mechanically during installation. NOTE: Side lap joints and/or exposed structural fasteners are NOT allowed.

D. Panel end laps. When roofs measure 45 feet or less from ridge to eave, etc, end laps will NOT be allowed. When permitted, ends shall have a minimum of 6" overlapped, using the manufacturer's required attachment method and sealant.

E. Panels shall be attached with concealed clip fasteners, spaced as required to provide for both positive and negative design loads while allowing for expansion and contraction of the entire roofing system resulting from annual variations in temperature.

F. The standing seam roofing system shall be listed by Underwriter's Laboratories for wind uplift classification U.L. 90.

2.05 ACCESSORIES

A. Gutters:

1. Manufacturer's standard configuration. Size as shown or called for on drawings.
2. 24 gauge, to match roof panels, Color as selected by the A/E.
3. Manufacturer's standard support bracket spaced a maximum of 48" o.c.
4. Manufacturer's standard leader to match the gutter, with non-corroding wire ball strainer.

B. Downspouts:

1. Downspouts to match the material and finish of the gutters.
2. 24 gauge, size as shown or called for on drawings.

C. Precast concrete splash blocks, size as shown or called for on drawings.

D. Roof Curbs:

1. Roof curbs shall be supplied by, or acceptable to, the building manufacturer.
2. Roof curbs shall be a minimum of 12" above the roof panels.
3. Shall be insulated.
4. Provide additional header framing required by the manufacturers to support the

equipment load and roof panels on all sides of the roof curb openings.

E. Roof Penetration Flashings:

1. Tapered EPDM rubber cones for round penetrations from 3" to 11", supplied by, or acceptable to, the building manufacturer.
2. Metal roof flashings supplied by, or acceptable to, the building manufacturer.
3. Locate penetrations to avoid the standing seams, if possible.

2.06 METAL WALL PANELS

A. General - For metal wall panel requirements, see Section 07420 - Formed Metal Wall Panels.

2.07 INTERIOR LINER PANELS

A. The interior liner panel shall be a minimum of 26 gauge galvanized sheet steel, ASTM A446, Grade A, 33,000 psi minimum

B. Size as indicated on drawings, standard factory applied finish, color selection by the owner.

2.08 PREFINISHED STEEL SOFFIT PANELS

A. Porch ceilings shall be pre-finished, 24-gauge steel, lap-seam panels in a flush profile with concealed fasteners and related trim and accessories by the metal building manufacturer. Color to be selected from the manufacturer's full range of standard colors.

2.09 FLASHING MATERIALS

A. The wall base angle shall be a minimum of 18 gauge, G-90 galvanized steel, prefinished to match the wall panels.

B. Flashings, trim closures, and transition materials shall be supplied or approved by the building manufacturer, and be of the same metal and finish as the corresponding roof or wall panel.

C. Rubber gaskets and closure strips shall be supplied or approved by the building manufacturer.

2.10 FASTENERS

A. Bolts for structural joints shall be high strength conforming to ASTM A-325, or ASTM A-490.

B. All exposed fasteners shall be #302 stainless steel, or aluminum-zinc head, size and type as specified by the building manufacturer.

C. All concealed fasteners shall be corrosion resistant, size and type as specified by the building manufacturer.

D. Blind rivets shall be a minimum of 5/32" aluminum, pull type, self-clinching, size as recommended by the building manufacturer painted to match the component being installed.

2.11 INSULATION SYSTEMS

A. Acceptable Manufacturers:
1. Johns Manville Simple Saver System
2. L&L Insulation, L&L Saver System FP
3. Silvercote Lamination, Energy Saver FP

B. Under Roofing Panels:

1. Install one layer of unfaced fiberglass insulation parallel to purlins below roof deck, R-11; stagger joints with layer below

2. Install one layer of unfaced fiberglass insulation parallel to purlins above fabric ceiling, R-19; stagger joints with layer above.

C. Thermal spacer blocks of extruded polystyrene with 1" thickness above the purlin flange.

D. Wall insulation: Instal one layer of fiberglass insulation with thermal tape in cavity between wall girts and exterior wall panels, R-25

E. Foundation insulation: Rigid extruded polystyrene, as shown or called for on drawings.

2.12 CEILING FABRIC

A. Part of insulation system manufacturers.

B. Systems and Materials

1. Ceiling fabric system shall fasten to bottom of purlins and allow full thickness insulation throughout span.

2. Fabric to be woven reinforced high density polyethylene yarns coated on both sides with a continuous white polyethylene film.

3. Fabric to be supported by painted high tensile steel straps, size and spacing by manufacturers recommendations. Straps to be galvanized, primed, and painted the specified color of the fabric on the exposed side with a a clear coat primer on the unexposed side.

4. Fabric shall comply with ASTM E84 and be Class A compliant with a low flame spread index of 25 or less

5. Liner fabric perm rating shall be a maximum of .02 grains per hour per square foot base of ASTM E96 procedure B. Liner shall act like a vapor barrier and be continuous with facing of wall insulation backing.

6. Sealants for system shall be high-tack solvent based vapor barrier sealant and/or double sided vapor barrier bonding tape.

2.13 SEALANTS & CAULKING

A. Sealants in joints between system components shall be as specified or recommended by the building manufacturer.

B. General purpose sealants and interior caulking not specified by the building manufacturer are specified in Section 07900.

2.14 DOORS AND WINDOWS - See the appropriate specification section elsewhere in this project manual.

3. EXECUTION

3.01 INSPECTION. Examine the foundations and the conditions under which pre-engineered building work is to be performed. Notify the A/E in writing of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 ERECTION.

A. Clean concrete or masonry bearing surfaces to assure bond. Clean the bottom surface of base and bearing plates.
B. Set the base and bearing plates on grout beds. Use shims or leveling bolts only after

authorization from the Architect/Engineer.

C. Pack grout solidly between the foundation surfaces and the plates, ensuring there are no voids, in accord with the grout manufacturer's instructions. Finish the exposed grout, and allow curing for 7 days.

3.03 FIELD ASSEMBLY

A. Erect framing in accord with AISC specifications, and as herein specified. Maintain the work in a safe and stable condition during erection.
B. Provide temporary shoring, bracing, and guy wires to attain proper alignment as erection proceeds.
C. Erect framing true to line, level and plumb.
D. Secure anchor bolts with double nuts.
E. Do not cut or alter structural members without prior approval of the building manufacturer and the A/E.
F. Splice members only where indicated on the final shop drawings that have been reviewed and approved by the buildings manufacturer and the Architect/Engineer.
G. Bolted connections tightened by the turn-of-the-nut method shall have at least two bolts match-marked to permit visual inspection.
H. Bolt holes that require enlarging to admit the bolt shall be reamed. Do not use gas cutting torches in the field to correct fabrication errors in structural framing.

3.04 TOUCH-UP PAINTING. Immediately after erection, clean all field welds, bolted connections, and abraded areas, and paint all exposed areas with the same paint as used for shop priming. Apply either by brush or spray to provide a minimum dry thickness of 2.0 mils.

3.05 ROOFING AND WALL PANELS

A. Standing Seam Steel Roofing Panels: Install the steel liner panels per the manufacturer's instructions.

B. Install fiberglass insulation rolls, with thermal spacer blocks at framing members, using recommended pins, clips, and fasteners, and following the building manufacturer's instructions.
   1. Do not install more insulation than can be covered by the end of the work day, nor allow it to become wet.
   2. Install the standing seam roofing panels using concealed clips in accord with the manufacturer's current printed instructions.
   3. Install all flashings, trim, roof curb openings, ridge caps, gutters and downspouts, etc. in strict accord with the manufacturer's instructions.

C. Provide a weathertight roof assembly meeting all of the manufacturer's requirements.

D. Install wall panels using concealed fasteners, except for trim items, per the manufacturer's current printed instructions.
   1. Erect panels true to line and plumb.
   2. Install sealants and/or gaskets required by the manufacturer.

E. Install all flashings, trim, and accessory items in accord with the manufacturer's instructions.

F. Provide a weathertight wall assembly meeting all of the manufacturer's requirements.

3.06 DOORS AND WINDOWS. Install manufacturer’s standard windows and doors of type and size shown on the drawings unless otherwise shown or called for on the drawings or specified herein.

3.07 FIELD QUALITY CONTROL

A. The A/E will provide onsite observation prior to, during, and after erection of the various building systems.
B. The building manufacturer will provide onsite observation, assistance and necessary training or instruction to their franchised or approved erector/installer as is reasonably necessary to provide a

satisfactory installation.

3.08 ADJUST AND CLEAN

A. Carefully inspect all completed work, and correct all defects.
B. Accompany the representatives from the manufacturer, Architect/Engineer and Owner during inspections of the work. Assist with equipment and workmen when necessary to provide access. Correct all defects noted.
C. Remove all spilled and excessive mastic and sealant. Remove all strippable film.
D. Remove all damaged and defective work, and replace with new materials.
E. Clean up and remove from the site, all surplus materials, construction aids, and debris. Do NOT bury or burn any materials on the site.
F. Provide protection of all finished work until Substantial Completion.

END 13340

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid:

1. General Contractor Provide:
   a. Pre-engineered metal building systems as shown and herein specified, including framing at porches.
   b. Structural framing and subframing systems.
   c. Sheet metal flashing & trim.
   d. Exterior doors and windows.
   e. Standing seam metal roof.
   f. EPDM roofs on porches.
   g. Preformed metal wall panel.
   h. Overhead doors.
   i. Roof opening curbs.

1.02 SYSTEM DESCRIPTION

A. Building Description:

1. Clear span rigid frame with cross-section as shown on the Drawings.
2. Bay spacing as shown on the Drawings.
3. Roof slope as shown on the drawings

B. Design Specifications:

1. "Metal Building Systems Manual," 2012 edition, Metal Building Manufacturer's Association. (MBMA)
2. "Manual of Steel Construction," 14th edition, American Institute of Steel Construction. (AISC)
3. "Specification for Structural Steel Buildings." 2015 edition (AISC)
4. "Cold-Formed Steel Design Manual," 2008 edition, American Iron and Steel Institute. (AISI)
5. ICC-IAS AC172 or AC472 Accreditation

C. Design Loads:

1. Basic design loads include live, seismic, wind, and dead loads. All other design loads such as mechanical equipment loads (static, dynamic, or kinetic) are classified as auxiliary loads.
2. All loads given are minimum requirements. All applicable provisions of the International Building Code (2006 edition)
3. Basic design loads for wall and roof components are as follows:
   a. Wind speed 90 mph.
   b. Exposure: B, Enclosed.
   c. Snow/Wind Importance factor based upon building usage: 1.15.
   d. Ground snow load = 20 psf.
   e. Seismic Zone loads shall be determined upon Soil Site Class “E”: S_{DS} = 0.453g, S_{D1} = 0.282g, Importance factor 1.50.
   f. MBMA, 2012 edition, application and combination of loads.)

4. Design each member to withstand stresses resulting from a combination of loads that produce the maximum percentage of actual to allowable stress in the member, as prescribed by AISC.

a. Maximum individual member deflection for primary horizontal members shall be L/240, and for vertical members L/180.
b. Maximum individual member deflection for secondary members is L/180.

5. Wind load shall be determined by the following:
   a. The wind on the structure shall be proportioned and applied as horizontal and uplifting forces according to the IBC requirements.

6. Wind loads to masonry walls shall be applied as lateral forces to columns equal to the wind load across the tributary width between columns.

D. Seismic forces from masonry wall systems shall be transferred to the structure as lateral forces at the building columns. Forces from walls shall be determined from wall cross-sections shown on the Drawings, using horizontal force factors for elements of structures as required by the IBC.
   1. Roof components shall comply with U.L. Class 90 wind uplift requirements.
   2. Indicate the basic design load on the Drawings.

1.03 REFERENCES

A. ASTM A-36 - Structural Steel.
B. ASTM A-325 -High Strength Bolts for Structural Steel.
C. ASTM A-446 - Steel Sheet, Zinc-Coated (Galvanized) Structural Quality.
D. ASTM A-463 - Specification Steel Sheet, Cold-Rolled, Aluminum-Coated, Types 1 & 2.
E. ASTM A-475 -Specification for Zinc-Coated Steel Wire Strand.
F. ASTM A-490 -Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints.
G. ASTM A-500 -Cold-Formed Welded and Seamless Carbon Steel Structural Tubing.
H. ASTM A-501 -Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
I. ASTM A-525 -Steel Sheet, Zinc-Coated (Galvanized) by the Hot Dip Process.
J. ASTM A-570 -Specification for Hot-Rolled Carbon Steel Sheet and Strip.
K. ASTM A-572 -High Strength Low Alloy Columbium Vanadium Steel, Structural Quality.
L. ASTM A-607 -Specification for Steel Sheet and Strip, Hot-Rolled and Cold-Rolled.
M. ASTM A-792 -Specification for Steel Sheet, Aluminum-Zinc Alloy Coated.
N. ASTM C-553 -Mineral Fiber Blanket and Felt Insulation.
O. ASTM C-665 -Mineral Fiber Blanket Thermal Insulation for Light Frame Construction.
P. ASTM E-84-Test Method for Surface Burning Characteristics of Building Materials.
Q. ASTM E-96-Test Method of Water Vapor Transmission of Materials.
R. SSPC -Steel Structures Painting Council.
S. TIMA-202-Metal Building Insulation Standard.
T. HH-I-521-Insulation Blanket, Thermal.
U. HH-I-558-Insulation, Blocks, Boards, Blankets, Felts, Covering Thermal.
V. HH-I-1972-Insulation, Board (Thermal).
W. AWS -Structural Welding Code, American Welding Society, D1.1, D1.3.
X. UL 90-Wind Uplift Requirements.
Y. UL 580 - Tests for Uplift Resistance of Roof Assemblies, 1994

1.04 QUALITY ASSURANCE

A. Building System Requirements:
   1. Provide building components manufactured, marketed, or approved by a single specified building manufacturer.
   2. Be, or subcontract erection to, a firm approved or franchised by a specified building manufacturer.
   2. Structural component design to be under the direct supervision of a Registered Structural Engineer, licensed in the State of Illinois.

B. Regulatory Requirements: Building Code: International Building Code (2012 edition).

1.05 SUBMITTALS.

A. Make all submittals in accord with Section 01300.

B. Product Data

C. Report of Force Reactions at Foundations

D. Shop Drawings:
1. Submit only shop drawings that have been reviewed and approved by the building manufacturer's technical representative.
2. Submit 6 copies of complete erection drawings, showing anchor bolt setting, roof, wall, and accessory installation details. Clearly indicate the proper assembly of all building components.
3. Submit a diagram indicating building/column reaction loads to the foundation system for approval, prior to foundation construction.
4. Samples of metal pieces: siding, roofing, trim, gutters, etc. along with color selector charts.

1.06 DELIVERY, STORAGE AND HANDLING

A. Deliver and store prefabricated components, sheets, panels, and other items so that they will not be damaged, deformed, or stained.

B. Remove all damaged and defective materials from the job site.

1.07 JOB CONDITIONS. This is a new construction, pre-engineered building project for the City of Mattoon, on about 5.75 acres of undeveloped land.

1.08 WARRANTY

A. General Contractor: Provide the following a General Contractor’s warranty for one year in accord with the General Conditions.

B. Building Manufacturer: Provide a warranty which includes ALL of the elements outlined below:

1. The pre-engineered metal building manufacturer warrants to the Owner that it shall at its own expense, make or cause to be made, all repairs or replacements, including all inspections, labor and materials to those items they furnished or approved, to maintain the metal building systems in the condition specified below, and in the applicable portion of Section 13340 of the Project Specifications, for the time periods specified below, following the Date of Substantial Completion of this project.

a. Basic Warranty: Materials & workmanship: One year for all metal building systems.

b. Extended Warranties: Weathertightness: Ten years for the following when they are provided as a part of the building:
(1) Metal or composite flashings.
(2) Standing seam steel roofing.
(3) Metal wall panel system. Insulated metal wall panel system.
(4) Roof opening curbs. Ventilators. Skylights.

c. Extended Warranties: Metal Finish, Roof or Wall Panels: Twenty (20) years **from date of shipment** on fluoropolymer resin paint, or metallurigic coatings, against the following conditions:
(1) Perforation, Peeling, Flaking, Blistering.
(2) Color change in excess of the manufacturer’s published amount (paint).

2. Liability Limits: The building manufacturer's liability for each listed building system shall be limited to the original installed cost for each system, including all labor and materials. The Architect/Engineer shall determine these costs and liability from the General Contractor's Schedule of Values.

3. Manufacturer's Responsibilities: The manufacturer or his representative shall respond within 15 days of written notification by the Owner, of leaks or other defects with an inspection. Replacement and/or repair of defective components or systems covered under the Warranty shall commence within 30 days of the notification date, and shall be made at no cost to the Owner, up to the amount of the manufacturer's liability limit. All inspections made by the manufacturer or his representative under this Warranty will require a written report to the Owner within 30 days of the inspection.

4. Owner's Responsibilities: The Owner will notify the manufacturer if a defect covered by this Warranty is discovered. Notice may be by phone, email, fax, or U.S. Mail, to the manufacturer's office (address to be provided by the manufacturer) within 30 days of discovery.

5. Exclusions:
   a. Damage to the building contents.
   b. Damage resulting from repairs made to the building systems or components without the manufacturer's prior written authorization, except where such repairs are made after the manufacturer fails to honor the terms of this Warranty.
   3. Modifications to any building system or component after Substantial Completion without prior written authorization from the manufacturer.
   4. Damage resulting from any of the following:
      a. Settlement, expansion, contraction, cracking, warping, or movement of non-building systems or components, foundations, or floor slab.
      b. Natural disasters: Windstorms exceeding the testing limits of U.L. 90, hurricane, cyclone, tornado, flood, hail, lightning, or earthquake.
      c. Accidents, vandalism, or other uncontrollable events.
      d. Chemical attack from sources unknown, or not present or foreseeable at the time of the building system installation.
      e. Falling objects, misuse or abuse of a system, or material storage or debris on the roof.
      f. Infiltration of moisture or condensation in, through, or around non-system components, or underlying or surrounding areas, unless caused by defective installation of a warranted system or its components.
      g. Failure of the materials supplied by others, except where such items are specified or advertised by the manufacturer as a part of the building system.
      h. Failure of the Owner to notify the Manufacturer of leaks of other defects within 30 days of discovery.

6. The implied warranties of merchantability and fitness for a particular purpose are excluded.

7. Warranties containing riders or qualifying statements, or any terms other than as herein stated, will not be acceptable to the Owner.

2. PRODUCTS

2.01 MATERIALS

A. All cold-formed structural steel members shall conform to ASTM A-570, Grade 55, milled for structural members.

B. All hot-formed welded and seamless structural steel tubing shall conform to ASTM A-501.

C. All structural steel members shall be galvanized, or shop painted with one coat of primer.

D. Galvanized steel sheet shall conform to ASTM A-446.

E. Aluminum-zinc coated steel sheet shall conform to ASTM A-792.

F. Aluminum coated steel sheet shall conform to ASTM A-463.

G. Diagonal bracing cable shall conform to ASTM A-475, Class A.

H. Wind bracing rod shall be adjustable threaded steel rod, ½" minimum diameter, conforming to ASTM A-36.

I. Structural tubing shall conform to ASTM A-500, Grade B.

J. Bolts shall conform to ASTM A-325.

2.02 ACCEPTABLE MANUFACTURERS

A. The following manufacturers are acceptable, provided they can furnish or approve all components that meet the specification:

1. A & S Building Systems, Inc.
2. American Buildings Co.
3. Behlen Building Systems
4. Butler Manufacturing Co.
5. Chief Buildings
6. Gulf States Manufacturers
7. Inland Buildings
8. Mesco Building Solutions
9. Nucor Building Systems
10. Schulte Building Systems, Inc.
11. Varco-Pruden Buildings

2.03 STRUCTURAL FRAMING COMPONENTS

A. Primary Framing:

1. A frame system that provides the configuration shown on the Drawings.
2. Roof Slope to be as shown on drawigns.
3. Factory weld and shop paint all primary framing components.
4. Factory drilled or punched holes for bolted field assembly.
5. All welded shop connections shall be in accord with AWS "Structural Welding Code," D1.1.

B. Secondary Framing:

1. Purlins, girts, eave struts, end wall beams, flange and sag bracing shall be a minimum of 16 gauge, cold-formed section, shop painted or galvanized.
2. The purlin system shall be capable of supporting the dead load, live load, and all other loads imposed by the attachment of (*ceilings) (*equipment) (*utility lines).

C. End Wall Columns: Factory welded, built-up "I" shape or cold-formed sections of at least 14 gauge steel, with a maximum of L/240 at locations with brick veneer only, or L/180 deflection at painted or galvanized metal siding.

D. Fabrication:

1. Shop fabricate to the indicated size and section, complete with base plates, bearing plates, and other plates for erection, welded in place, and with all holes for anchoring or connections shop drilled or punched to template dimensions.
2. Shop welders shall have passed tests prescribed by the American Welding Society Code

D1.1 and/or D1.3 for process, position, and joint type.

E. Shop Painting:

1. Clean surfaces to be primed of loose mill scale, rust, dirt, oil, grease, and other matter precluding paint bond. Follow, as appropriate, one or more specifications of the Steel Structures Painting Council.
2. Apply one coat of rust inhibitive alkyd zinc chromate, red oxide or waterborne primer, 1.0 mil. dry thickness.
3. Do not paint surfaces that will be welded, or are scheduled to receive spray-on fireproofing.

2.04 STANDING SEAM STEEL ROOFING SYSTEM

A. Standing seam steel roofing panels to be the configuration shown on the Drawings, or as approved by the A/E, and factory fabricated from 24 gauge steel. NOTE: JOB-SITE ROLL-FORMING NOT PERMITTED.

B. The exposed finish shall be 70% fluorocarbon resin paint over Galvalume produced to ASTM A792/A792M-A250, or A255. Color as selected by the A/E from the manufacturer's standard colors. More than one color may be selected.

C. Panels to be interlocking, with non-hardening factory applied seam sealant. Seams to be continuously locked or crimped mechanically during installation. NOTE: Side lap joints and/or exposed structural fasteners are NOT allowed.

D. Panel end laps. When roofs measure 45 feet or less from ridge to eave, etc, end laps will NOT be allowed. When permitted, ends shall have a minimum of 6" overlapped, using the manufacturer's required attachment method and sealant.

E. Panels shall be attached with concealed clip fasteners, spaced as required to provide for both positive and negative design loads while allowing for expansion and contraction of the entire roofing system resulting from annual variations in temperature.

F. The standing seam roofing system shall be listed by Underwriter's Laboratories for wind uplift classification U.L. 90.

2.05 ACCESSORIES

A. Gutters:

1. Manufacturer's standard configuration. Size as shown or called for on drawings.
2. 24 gauge, to match roof panels, Color as selected by the A/E.
3. Manufacturer's standard support bracket spaced a maximum of 48" o.c.
4. Manufacturer's standard leader to match the gutter, with non-corroding wire ball strainer.

B. Downspouts:

1. Downspouts to match the material and finish of the gutters.
2. 24 gauge, size as shown or called for on drawings.

C. Precast concrete splash blocks, size as shown or called for on drawings.

D. Roof Curbs:

1. Roof curbs shall be supplied by, or acceptable to, the building manufacturer.
2. Roof curbs shall be a minimum of 12" above the roof panels.
3. Shall be insulated.
4. Provide additional header framing required by the manufacturers to support the

equipment load and roof panels on all sides of the roof curb openings.

E. Roof Penetration Flashings:

1. Tapered EPDM rubber cones for round penetrations from 3" to 11", supplied by, or acceptable to, the building manufacturer.
2. Metal roof flashings supplied by, or acceptable to, the building manufacturer.
3. Locate penetrations to avoid the standing seams, if possible.

2.06 METAL WALL PANELS

A. General - For metal wall panel requirements, see Section 07420 - Formed Metal Wall Panels.

2.07 INTERIOR LINER PANELS

A. The interior liner panel shall be a minimum of 26 gauge galvanized sheet steel, ASTM A446, Grade A, 33,000 psi minimum

B. Size as indicated on drawings, standard factory applied finish, color selection by the owner.

2.08 PREFINISHED STEEL SOFFIT PANELS

A. Porch ceilings shall be pre-finished, 24-gauge steel, lap-seam panels in a flush profile with concealed fasteners and related trim and accessories by the metal building manufacturer. Color to be selected from the manufacturer's full range of standard colors.

2.09 FLASHING MATERIALS

A. The wall base angle shall be a minimum of 18 gauge, G-90 galvanized steel, prefinished to match the wall panels.

B. Flashings, trim closures, and transition materials shall be supplied or approved by the building manufacturer, and be of the same metal and finish as the corresponding roof or wall panel.

C. Rubber gaskets and closure strips shall be supplied or approved by the building manufacturer.

2.10 FASTENERS

A. Bolts for structural joints shall be high strength conforming to ASTM A-325, or ASTM A-490.

B. All exposed fasteners shall be #302 stainless steel, or aluminum-zinc head, size and type as specified by the building manufacturer.

C. All concealed fasteners shall be corrosion resistant, size and type as specified by the building manufacturer.

D. Blind rivets shall be a minimum of 5/32" aluminum, pull type, self-clinching, size as recommended by the building manufacturer painted to match the component being installed.

2.11 INSULATION SYSTEMS

A. Acceptable Manufacturers:
1. Johns Manville Simple Saver System
2. L&L Insulation, L&L Saver System FP
3. Silvercote Lamination, Energy Saver FP

B. Under Roofing Panels:

1. Install one layer of unfaced fiberglass insulation parallel to purlins below roof deck, R-11; stagger joints with layer below

2. Install one layer of unfaced fiberglass insulation parallel to purlins above fabric ceiling, R-19; stagger joints with layer above.

C. Thermal spacer blocks of extruded polystyrene with 1" thickness above the purlin flange.

D. Wall insulation: Instal one layer of fiberglass insulation with thermal tape in cavity between wall girts and exterior wall panels, R-25

E. Foundation insulation: Rigid extruded polystyrene, as shown or called for on drawings.

2.12 CEILING FABRIC

A. Part of insulation system manufacturers.

B. Systems and Materials

1. Ceiling fabric system shall fasten to bottom of purlins and allow full thickness insulation throughout span.

2. Fabric to be woven reinforced high density polyethylene yarns coated on both sides with a continuous white polyethylene film.

3. Fabric to be supported by painted high tensile steel straps, size and spacing by manufacturers recommendations. Straps to be galvanized, primed, and painted the specified color of the fabric on the exposed side with a a clear coat primer on the unexposed side.

4. Fabric shall comply with ASTM E84 and be Class A compliant with a low flame spread index of 25 or less

5. Liner fabric perm rating shall be a maximum of .02 grains per hour per square foot base of ASTM E96 procedure B. Liner shall act like a vapor barrier and be continuous with facing of wall insulation backing.

6. Sealants for system shall be high-tack solvent based vapor barrier sealant and/or double sided vapor barrier bonding tape.

2.13 SEALANTS & CAULKING

A. Sealants in joints between system components shall be as specified or recommended by the building manufacturer.

B. General purpose sealants and interior caulking not specified by the building manufacturer are specified in Section 07900.

2.14 DOORS AND WINDOWS - See the appropriate specification section elsewhere in this project manual.

3. EXECUTION

3.01 INSPECTION. Examine the foundations and the conditions under which pre-engineered building work is to be performed. Notify the A/E in writing of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 ERECTION.

A. Clean concrete or masonry bearing surfaces to assure bond. Clean the bottom surface of base and bearing plates.
B. Set the base and bearing plates on grout beds. Use shims or leveling bolts only after

authorization from the Architect/Engineer.

C. Pack grout solidly between the foundation surfaces and the plates, ensuring there are no voids, in accord with the grout manufacturer's instructions. Finish the exposed grout, and allow curing for 7 days.

3.03 FIELD ASSEMBLY

A. Erect framing in accord with AISC specifications, and as herein specified. Maintain the work in a safe and stable condition during erection.
B. Provide temporary shoring, bracing, and guy wires to attain proper alignment as erection proceeds.
C. Erect framing true to line, level and plumb.
D. Secure anchor bolts with double nuts.
E. Do not cut or alter structural members without prior approval of the building manufacturer and the A/E.
F. Splice members only where indicated on the final shop drawings that have been reviewed and approved by the buildings manufacturer and the Architect/Engineer.
G. Bolted connections tightened by the turn-of-the-nut method shall have at least two bolts match-marked to permit visual inspection.
H. Bolt holes that require enlarging to admit the bolt shall be reamed. Do not use gas cutting torches in the field to correct fabrication errors in structural framing.

3.04 TOUCH-UP PAINTING. Immediately after erection, clean all field welds, bolted connections, and abraded areas, and paint all exposed areas with the same paint as used for shop priming. Apply either by brush or spray to provide a minimum dry thickness of 2.0 mils.

3.05 ROOFING AND WALL PANELS

A. Standing Seam Steel Roofing Panels: Install the steel liner panels per the manufacturer's instructions.

B. Install fiberglass insulation rolls, with thermal spacer blocks at framing members, using recommended pins, clips, and fasteners, and following the building manufacturer's instructions.
   1. Do not install more insulation than can be covered by the end of the work day, nor allow it to become wet.
   2. Install the standing seam roofing panels using concealed clips in accord with the manufacturer's current printed instructions.
   3. Install all flashings, trim, roof curb openings, ridge caps, gutters and downspouts, etc. in strict accord with the manufacturer's instructions.

C. Provide a weathertight roof assembly meeting all of the manufacturer's requirements.

D. Install wall panels using concealed fasteners, except for trim items, per the manufacturer's current printed instructions.
   1. Erect panels true to line and plumb.
   2. Install sealants and/or gaskets required by the manufacturer.

E. Install all flashings, trim, and accessory items in accord with the manufacturer's instructions.

F. Provide a weathertight wall assembly meeting all of the manufacturer's requirements.

3.06 DOORS AND WINDOWS. Install manufacturer’s standard windows and doors of type and size shown on the drawings unless otherwise shown or called for on the drawings or specified herein.

3.07 FIELD QUALITY CONTROL

A. The A/E will provide onsite observation prior to, during, and after erection of the various building systems.
B. The building manufacturer will provide onsite observation, assistance and necessary training or instruction to their franchised or approved erector/installer as is reasonably necessary to provide a

satisfactory installation.

3.08 ADJUST AND CLEAN

A. Carefully inspect all completed work, and correct all defects.
B. Accompany the representatives from the manufacturer, Architect/Engineer and Owner during inspections of the work. Assist with equipment and workmen when necessary to provide access. Correct all defects noted.
C. Remove all spilled and excessive mastic and sealant. Remove all strippable film.
D. Remove all damaged and defective work, and replace with new materials.
E. Clean up and remove from the site, all surplus materials, construction aids, and debris. Do NOT bury or burn any materials on the site.
F. Provide protection of all finished work until Substantial Completion.

END 13340

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide valves, supports and anchors, and piping identification.

2. PRODUCTS

2.01 VALVES

A. General:

1. Provide valves of same manufacturer throughout where possible.
2. Provide valves with manufacturer's name and pressure rating clearly marked on outside of body.

B. Valve Connections:

1. Provide valves suitable to connect to adjoining piping as specified for pipe joints. Use pipe size valves.
2. Thread pipe sizes 2 inches and smaller.
3. Flange pipe sizes 2-1/2 inches and larger.
4. Solder or screw to solder adaptor for copper tubing.

C. Ball Valves:

1. Up to 2 inches: Bronze body, glass reinforced TFE seats, chrome plated carbon steel ball. solder or screwed ends.
2. Over 2 inches: Cast steel body, chrome plated steel ball, teflon seat and stuffing box seals, flanged.

D. Plug Cocks:

1. Up to 2 Inches: Iron body, brass plugs and washers, air tested, solder or screwed ends.
2. Over 2 Inches: Iron body and plug, pressure lubricated type, flanged ends.

E. Pressure Ratings: Unless otherwise indicated, use valves suitable for 125 minimum psig WSP and 450° F and maximum 200 psig and 250° F.

F. Valve Operators:

1. Provide suitable operators for all valves.
   a. Ball valve: Lever handle.
   b. Plug cock: Plug cock wrench.

G. Drain Valves:

1. Bronze compression stop with nipple and cap or hose thread.

2.02 PIPE HANGERS AND SUPPORTS

A. Hangers for Pipe Sizes ½ to 1-1/2 Inch: Malleable iron or Carbon steel, adjustable swivel, split ring.

B. Hangers for all Pipe Sizes 2 to 4 Inches, and cold pipe sizes up to 10 inches: Carbon steel, adjustable, clevis.

C. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

D. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

E. Shield for Insulated Piping 2 Inches and Smaller: 18 gage galvanized steel shield over insulation in 180 degree segments, minimum 12 inches long at pipe support.

2.03 HANGER RODS: Steel Hanger Rods: Threaded both ends, threaded one end, or continuous threaded.

2.04 SLEEVES

A. Sleeves for Pipes Through Walls, and Footings: Form with steel pipe or 18 gage galvanized steel.

B. Stuffing Insulation: Glass fiber type, noncombustible.

C. Caulk: Acrylic sealant.

2.05 FABRICATION

A. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.

B. Design hangers without disengagement of supported pipe.

C. Provide copper plated hangers and supports for copper piping.

2.06 FINISH: Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

2.07 IDENTIFICATION MATERIALS

A. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and fluid being conveyed.

1. Domestic water markers shall have a green background with white lettering and shall read: Cold Water, Hot Water, or Hot Water Return. All pipe sizes 1/2" and larger.

B. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

3. EXECUTION

3.01 INSTALLATION

A. Install valves with stems upright or horizontal, not inverted.

B. Install ball valves for shut-off and isolating service, to isolate equipment, part of systems, or vertical risers.

C. Use plug cocks for gas service.

D. Provide drain valves at main shut-off valves, and low points of piping and apparatus.

3.02 PIPE HANGERS AND SUPPORTS

A. Support horizontal piping as follows:

PIPE SIZE	MAX. HANGER SPACING	HANGER DIAMETER
½ to 1¼ inch	6'-6"	3/8"
1-1/2 to 2 inch	10'-0"	3/8"
2-1/2 to 3 inch	10'-0"	1/2"
4 to 6 inch	10'-0"	5/8"
PVC (All Sizes)	6'-0"	3/8"

B. Install hangers to provide minimum ½ inch space between finished covering and adjacent work.

C. Place a hanger within 12 inches of each horizontal elbow.

D. Use hangers with 1-1/2 inch minimum vertical adjustment.

E. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

F. Support riser piping independently of connected horizontal piping.

3.03 SLEEVES

A. Set sleeves in position in formwork. Provide reinforcing around sleeves.

B. Install chrome plated steel escutcheons at finished surfaces.

3.04 MECHANICAL IDENTIFICATION

A. Piping:

1. Identify piping with plastic pipe markers or plastic tape pipe markers.
2. Identify service, flow direction. Install in clear view and align with axis of piping.
3. Identification not to exceed 15 feet on straight runs including risers and drops, adjacent to each valve and “T” at each side of penetration of structure or enclosure, and at each obstruction.

END 15050

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor to provide domestic hot water circulation pumps.

1.02 SUBMITTALS

A. Submit certified pump curves showing pump performance characteristics with pump and system operating point plotted.

2. PRODUCTS

2.01 GENERAL

A. Statically and dynamically balance rotating parts.

B. Construction to permit complete servicing without breaking piping or motor connections.

C. Pumps to operate at 1750 rpm unless specified otherwise.

D. Pump connections to be flanged.

2.02 IN-LINE CIRCULATOR

A. Casing: Bronze Cast iron rated for 125 psi working pressure.

B. Impeller: Bronze

C. Shaft: Alloy steel with integral thrust collar and two oil lubricated bronze sleeve bearings.

D. Seal: Carbon rotating against a stationary ceramic seat.

3. EXECUTION

3.01 INSTALLATION

A. Provide line sized gate valve and strainer on suction and line sized soft seated check valve and globe valve on discharge.

B. Decrease from line size, with long radius reducing elbows or reducers. Support piping adjacent to pump such that no weight is carried on pump casings.

C. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading, and operate within 25 percent of midpoint of published maximum efficiency curve.

3.02 PUMP SCHEDULE: See Plumbing Schedule on drawings.

END 15160

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide:
1. Piping insulation on domestic water piping.
2. Ductwork insulation.

1.02 REFERENCES

A. ASTM E84 - Surface Burning Characteristics of Building Materials.

B. NFPA 255 - Surface Burning Characteristics of Building Materials.

C. UL 723 - Surface Burning Characteristics of Building Materials.

1.03 QUALITY ASSURANCE

A. Applicator: Company specializing in piping insulation application with three years minimum experience.
B. Materials: Flame spread/smoke developed rating of 25/50 in accordance with ASTM E84 and UL 723.

1.04 SUBMITTALS

A. Submit product data under including product description, list of materials and thickness for each service, and locations.

2. PRODUCTS

2.01 PIPING INSULATION

A. Glass Fiber Insulation; ANSI/ASTM C547; 'k' value of 0.24 at 75°F, noncombustible.

2.02 DUCTWORK INSULATION

A. Exterior Duct Insulation: Flexible glass fiber; ANSI/ASTM C612; commercial grade; ‘k’ value of 0.29 at 75° F, 0.002 inch foil scrim facing for air conditioning ducts.

B. Duct Liner: Flexible glass fiber; ANSI/ASTM C553; 'k' value of 0.24 at 75° F 1.5 lb/cu ft minimum density; coated air side for maximum 4,000 ft/min air velocity.

C. Adhesives: Waterproof type.

D. Impale Anchors: Galvanized steel, 12 gage, self-adhesive pad.

E. Joint Tape: Glass fiber cloth, open mesh.

F. Tie Wire: Annotated steel, 16 gage.

2.03 PIPE JACKETS

A. Interior Applications:

1. Vapor Barrier Jackets: Kraft reinforced foil vapor barrier with self-sealing adhesive joints.

2. PVC Jackets: one piece, pre-molded type.

3. EXECUTION

3.01 PIPING INSULATION

A. Preparation: Install materials after piping has been tested and approved.

B. Installation:

1. Install materials in accordance with manufacturer's instructions.
2. In exposed piping, locate insulation and cover seams in least visible locations.
3. On insulated piping: Insulate flanges, unions, strainers, valves, and pumps.
4. Neatly finish insulation at supports, protrusions, and interruptions.
5. Install insulation as scheduled and metal jackets on exposed exterior piping.
6. Do not insulate below grade domestic water piping.
7. Apply insulation as close as possible to pumps by grooving, scoring, and beveling insulation, if necessary.
8. Do not insulate over nameplate or ASME stamps. Bevel and seal insulation around such.
9. Where pumps require periodical maintenance, repair, or cleaning, install insulation in such a manner that it can be easily removed and replaced without damage.

C. Pipe Insulation Schedule:

Description of Piping	Pipe Size	Insulation Data Thickness
Domestic Hot Water Supply	All	1"
Domestic Hot Water Recirculating	All	1"
Domestic Cold Water	All	1"

3.02 DUCTWORK INSULATION

A. Preparation: Clean surfaces for adhesives.

B. Exterior Insulation Application:

1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesion or tape to match jacket.
2. Secure insulation without vapor barrier with staples, tape, or wires.
3. Install without sag on underside of ductwork. Use adhesive or mechanical fasteners where necessary to prevent sagging. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
4. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

C. Installation:

1. Install materials in accordance with manufacturer's instructions.
2. Provide insulation with vapor barrier when air conveyed may be below ambient temperature.
3. Liner Application:
   a. Adhere insulation with adhesive for 100 percent coverage. Secure insulation with mechanical fasteners on 15 inch centers maximum on top and side of ductwork with dimension exceeding 20 inches. Seal and smooth joints. Do not use nail-type

fasteners. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.

b. Ductwork dimensions indicated are net inside dimensions required for air flow. Increase ductwork to allow for insulation thickness.

D. Schedule:

Ductwork:

Spiral and Round Supply Duct	1-1/2" thick exterior insulation R-5.5 minimum
Rectangular Supply Air Ducts	1" thick duct liner
Rectangular Return Air Ducts and Transfers	1" thick duct liner
Exhaust Air Ducts	None
Combustion Air Ducts	None
Flexible Duct (max. 5 foot)	R-6 equivalent minimum

3.03 JACKETS

A. Interior Piping.

1. Provide vapor barrier jackets.
2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe and finish with glass cloth and vapor barrier adhesive. Provide PVC jackets.

END 15250

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide pipe, fittings, and connections for wet-pipe sprinkler system.

1.02 REFERENCES

A. ANSI/ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800.

B. ANSI/ASME B16.3 - Malleable Iron Threaded Fittings, Class 150 and 300.

C. ANSI/ASME B16.4 - Cast Iron Threaded Fittings, Class 125 and 250.

D. ANSI/ASME B16.5 - Pipe Flanges and Flanged Fittings.

E. ANSI/ASME B16.9 - Factory made Wrought Steel Butt-welding Fittings.

F. ANSI/ASME B16.11 - Forged Steel Fittings, Socket-welding and Threaded.

G. ANSI/ASME B16.25 - Butt-welding Ends.

H. ANSI/ASME B36.10 - Welded and Seamless Wrought Steel Pipe.

I. ANSI/ASME Section 9 - Welding and Brazing Qualifications.

J. ANSI/ASME A135 - Electric-Resistance-Welded Steel Pipe.

K. ANSI/ASME A47 - Malleable Iron Castings.

L. ANSI/AWWS C110 - Ductile Iron and Gray Iron Fittings.

M. ANSI/AWWS C151 - Ductile Iron Pipe, Centrifugally Cast.

N. ASTM A53 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.

O. ASTM A120 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated (Galvanized) Welded and Seamless, for Ordinary Uses.

P. AWS D10.9 - Specifications for Qualification of Welding Procedures and Welders for Piping and Tubing.

Q. NFPA 13 - Installation of Sprinkler Systems.

1.03 QUALITY ASSURANCE

A. Conform to NFPA 13 for sprinkler systems.

B. Welding Materials and Procedures: Conform to ASME Code.

C. Employ certified welders in accordance with ANSI/ASME Section 9.

D. Valves: Bear UL label or marking. Provide manufacturer's name and pressure rating marked on valve body.

1.04 SUBMITTALS

A. Submit product data indicating pipe materials used, jointing methods, and supports.

B. Indicate valve data and ratings.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store valves in shipping containers, with labeling in place.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures. Maintain in place until installation.

2. PRODUCTS

2.01 PIPE AND TUBE

A. Steel Pipe: ASTM A53; ASTM A120; ANSI/ASME B36.10; black; weight specified.

2.02 PIPE FITTINGS

A. Steel Fittings: ASTM A234, wrought carbon steel and alloy steel.

2.03 UNIONS, FLANGES, AND COUPLINGS

A. Unions: 150 psi malleable iron for threaded ferrous piping.

B. Flanges: 150 psi forged steel slip-on flanges for ferrous piping.

C. Mechanical Grooved Couplings: Malleable iron housing clamps to engage and lock, designed to permit some angular deflection, contraction, and expansion; "C" shaped composition sealing gasket, steel bolts, nuts, and washers.

3. EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends to full inside diameter.

B. Remove burrs and bevel plain end ferrous pipe.

C. Remove scale and foreign material, inside and outside, before assembly.

3.02 INSTALLATION

A. Screw joint steel piping up to and including 1-1/2 inch diameter. Screw or weld 2 inch diameter piping. Weld piping 2-1/2 inch diameter and larger, including branch connections.

B. Mechanical grooved joints may be used instead of threaded or welded joints.

C. Die cut screw joints with full cut standard taper pipe threads with red lead and linseed oil or other non-toxic joint compound applied to male threads only.

D. Coat threaded ends with pipe lubricant compound.

E. Install piping in accordance with NFPA 13 for sprinkler systems.

F. Do not penetrate building structural members unless indicated.

G. Provide sleeves when penetrating footings, floors, and walls.

H. Seal pipe and sleeve penetrations to achieve fire resistance equivalent to fire separation required.

END 15310

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide wet-pipe sprinkler system, and associated hydraulic calculations.

1.02 REFERENCES

A. NFPA 13 - Installation of Sprinkler Systems.

1.03 SYSTEM DESCRIPTION

A. Provide system to NFPA 13 ordinary hazard, group 1 occupancy requirements.

1.04 QUALITY ASSURANCE

A. Design and installation to conform to NFPA 13.

B. Equipment and Components: Bear UL and FM label or marking.

C. Specialist Firm: Company specializing in sprinkler systems with ten years experience.

1.05 SUBMITTALS

A. Submit shop drawings and product data indicating hydraulic calculations, detailed pipe layout, hangers and supports, components and accessories bearing the approval stamp of a licensed fire sprinkler engineer.

1.06 OPERATION AND MAINTENANCE DATA

A. Submit manufacturer's operation and maintenance data including written maintenance data on components of system, servicing requirements, and Record Drawings.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide temporary inlet and outlet caps.

B. Maintain caps in place until installation.

1.08 EXTRA STOCK

A. Provide extra sprinkler heads under provisions of NFPA 13.

B. Provide suitable wrenches for each head type.

C. Provide metal storage cabinet in mechanical room with sprinkler riser.

2. PRODUCTS

2.01 FLOW ALARM: Provide automatic sprinkler valve flow detector with alarm circuits, pressure switch, pressure retard chamber, to be connected to the fire alarm panel.

2.02 ALARM: Eight inch diameter electric gong, with weatherproof backbox and alarm sign.

2.03 CONTROL VALVES: Provide Agency approved valves as required to properly operate and maintain the main

sprinkler riser.

2.04 TAMPER SWITCHES: Provide tamper switches on all control valves for monitoring; to be connected to fire alarm control panel.

2.05 DRAIN PIPING: Provide all required main drains and auxiliary drains per NFPA 13 to properly drain the complete systems, with the exception of drops to pendent sprinkler heads.

2.06 HANGERS: Provide all required hangers to properly support the complete system. Materials to be UL and FM approved for sprinkler installations per NFPA 13.

2.07 FIRE DEPARTMENT CONNECTION: Ductile iron; thread size to suit fire department hardware; two way threaded dust cap and chain of same material and finish, 3/4 inch automatic drip.

2.08 SPRINKLER HEADS:

A. Shall be UL and FM approved units; temperature rated for specific area hazard.

B. Finished Ceiling Areas: white, semi-recessed pendent sprinklers with matching escutcheon plates.

C. Exposed Piping Areas: Standard upright with brass finish.

D. Sidewall Type: Brass finish with matching escutcheon.

2.09 SPRINKLER CABINET: Provide one sprinkler cabinet complete with six heads and spare sprinkler head wrench.

3. EXECUTION

3.01 PREPARATION: Coordinate work of this Section with other affected work.

3.02 INSTALLATION

A. Locate fire department connection with sufficient clearance from walls or other obstructions to allow full swing of fire department wrench handle.

B. Locate outside alarm gong on building wall as indicated.

C. Center heads in two directions in ceiling tile and provide piping offsets as required.

D. Protect head from all painting operations.

E. Conceal all piping in finished areas.

3.03 CLEANING: Flush entire piping system of foreign matter.

3.04 SYSTEM TESTS

A. The entire system shall be tested in accordance with NFPA and local authority's test recommendations.

B. Test shall be witnessed by authority having jurisdiction.

C. Prepare the Certificate of Materials and Tests. Submit two (2) copies to the Architect/Engineer.

END 15330

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide:
1. Plumbing piping.
2. Plumbing specialties.
3. Plumbing fixtures.
4. Plumbing equipment.
5. Natural Gas piping.
6. Compressed Air piping

1.02 REFERENCES

A. ANSI/ASME B16.3 - Malleable Iron Threaded Fittings Class 150 NS 300.
B. ANSI/ASME Sec. 9 - Welding and Brazing Qualifications.
C. ANSI/ASTM B32 - Solder Metal.
D. ASTM A53 - Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
E. ASTM A120 - Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized), Welded and Seamless, for Ordinary Uses.
F. ASTM B88 - Seamless Copper Water Tube.
G. AWWA C601 - Standard Methods for the Examination of Water and Waste Water.
H. ASTM B306 - Copper Drainage Tube (DWV)
I. ASTM D2680 - Acrylonitrile-Butadiene-Styrene (ABS) Composite-Sewer Piping.
J. ASTM D2751 - Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings.
K. ASTM D2665 - Poly Vinyl Chloride (PVC) plastic Drain, Waste, and Vent Pipe and Fittings.
L. ASTM D2729 - Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings.
M. ANSI/ASSE 1011 - Hose Connection Vacuum Breakers.
N. ANSI/ASSE 1019 - Wall Hydrants, Frost Proof Automatic Draining Anti-Backflow Types.
O. ANSI A112.21.1 - Floor Drains.
P. ANSI A112.18.1 - Finished and Rough Brass Plumbing Fixture Fittings.
Q. ANSI A112.19.2 - Vitreous China Plumbing Fixtures.
R. ANSI A112.19.3 - Stainless Steel Plumbing Fixtures.
S. ANSI A112.19.5 - Trim for Water Closet - Bowls, Tanks, and Urinals.
T. ARI 1010 - Drinking Fountains and Self-Contained Mechanically Refrigerated Drinking Water Coolers.
U. ANSI/NFPA 70 - National Electrical Code.

1.03 QUALITY ASSURANCE

A. Each length of pipe fitting, trap, fixture or device used shall be stamped or indelibly marked with the weight and quality thereof, and the makers name or mark.

B. Manufacturer: For each product throughout specified, provide by same manufacturer.

1.04 SUBMITTALS: Submit product data to include, but not limited to materials, finishes, load ratings, and dimensional information.

1.05 STORAGE AND HANDLING: Store and protect products on site to avoid damage.

1.06 WARRANTY. Provide one year parts and labor on all plumbing fixtures and equipment.

A. Water Heater: Five year warranty on defective equipment

B. Water Cooler: Five year warranty on refrigeration portion of equipment.

2. PRODUCTS

2.01 PLUMBING PIPING (See Divisions 02600 & 02700 for Water and Sanitary piping beyond 5 feet from building)

A. Sanitary Sewer Piping, Below Grade:

1. ABS Pipe: ASTM D2661 or D2751. Fittings: ABS. Joints: ASTM D2235, solvent weld.
2. Schedule 40 PVC Pipe: ASTM D2665. Fittings: PVC. Joints: ASTM D2855, solvent weld.

B. Sanitary Sewer and Vent Piping, Above Grade:

1. ABS Pipe: ASTM D2661 or D2751. Fittings: ABS. Joints: ASTM D2235, solvent weld.
2. Schedule 40 PVC Pipe: ASTM D2665. Fittings: PVC. Joints: ASTM D2855, solvent weld.

C. Water Piping, Above Grade:

1. Copper Tubing: ASTM B88, Type L, hard drawn. Fittings: ANSI/ASME B16.23, cast brass, or ANSI/ASME B16.29, wrought copper. Joints: ANSI/ASTM B32, solder, Grade 95TA.
2. Schedule 80 CPVC (CTS): Pressure Class 200, ASTM D 2846. Joints & Fittings: ASTM D 2846, solvent weld ASTM F 493-2010.

D. Water Piping, Below Grade (Under Building):

1. Copper tubing: ASTM B88, Type K, hard drawn. Fittings: ANSI/ASME B16.29, wrought copper. Joints: ANSI/ASTM B32, solder, Grade 95TA.
2. Schedule 80 CPVC (CTS): Pressure Class 200, ASTM D 2846. Joints & Fittings: ASTM D 2846, solvent weld ASTM F 493-2010.

E. Natural Gas Piping, Above Grade:

1. Steel Pipe: ASTM A53 or A120, schedule 40 black. Fittings: ANSI/ASME B163, malleable iron, or ASTM 234, forged steel welding type. Joints: Screwed for pipe two inches and under; ANSI/AWS D1.1, welded for pipe over two inches.

F. Natural Gas Piping, Below Grade:

1. Polyethylene Pipe: ASTM D2513, SDR 11.5. Fittings: ASTM D2683 or ASTM D2513 socket type. Joints: Fusion welded.

G. Compressed Air:

1. Copper Tubing: ASTM B88, Type L, hard drawn. Fittings: ANSI/ASME B16.23, cast brass, or ANSI/ASME B16.29, wrought copper. Joints: ANSI/ASTM B32, solder, Grade 95TA.
2. Galvanized Steel Pipe: ASTM A53 or A120, schedule 40. Fittings: Cast iron Joints: Grooved mechanical couplings.

H. HVAC Condensate piping:

1. Plastic Pipe: ASTM D1785. Schedule 40 PVC; Fittings: PVC, ASTM D2665; Joints: Solvent Weld, ASTM D2564.

I. Flanges, Unions, and Couplings:

1. Pipe Size 2 Inches and Under: 150 psig malleable iron unions for threaded ferrous piping; bronze unions for copper pipe, soldered joints.

2. Pipe Size Over 2 Inches: 150 psig forged steel slip-on flanges for ferrous piping; bronze flanges for copper piping; 1/16 inch thick preformed neoprene bonded to non-combustible material.
3. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.02 PLUMBING SPECIALTIES See Plumbing Fixture Schedule on drawings.

2.03 PLUMBING FIXTURES See Plumbing Fixture Schedule on drawings.

2.04 PLUMBING EQUIPMENT See Plumbing Fixture Schedule on drawings.

3. EXECUTION

3.01 PLUMBING PIPING

A. Preparation:

1. Ream pipe and tube ends. Remove burrs.
2. Remove scale and dirt, on inside and outside, before assembly.
3. Prepare piping connections to equipment with flanges or unions.

B. Installation:

1. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
2. Route piping in orderly manner and maintain gradient.
3. Install piping to conserve building space and not interfere with use of space.
4. Group piping whenever practical at common elevations.
5. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
6. Provide clearance for installation of insulation and access to valves and fittings.
7. Slope water piping and arrange to drain at low points.
8. Establish elevations of buried piping outside the building to ensure not less than 3 ft. of cover.
9. Establish invert elevations, slopes for drainage to 1/8 inch per foot minimum. Maintain gradients.
10. Bury a tracer wire adjacent to all nonmetallic gas piping. Provide access at valve boxes and terminate above ground at each end.

C. Application:

1. Install unions downstream of valves and at equipment or apparatus connections.
2. Install gate or ball valves for shut-off and to isolate equipment.

D. Testing:

1. Test all piping systems in accordance with Illinois Plumbing Code.
2. Test gas piping for leaks before putting into service.

3.02 PLUMBING SPECIALTIES

A. Preparation: Coordinate forming of floor construction to receive drains and clean-outs to required invert elevations.

B. Installation and Application:

1. Install specialties in accordance with manufacturer's instructions to permit intended performance.
2. Extend clean-outs to finished floor or wall surface. Lubricate threaded clean-out plugs with mixture of graphite and linseed oil. Ensure clearance at clean-out for rodding of drainage system.
3. Encase exterior clean-outs in concrete flush with grade.

3.03 PLUMBING FIXTURES

A. Inspection:

1. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.
2. Verify adjacent construction is ready to receive rough-in work of this Section.

B. Installation:

1. Install each fixture with trap, easily removable for servicing and cleaning.
2. Provide chrome plated rigid or flexible supplies to fixtures with stops, reducers, and escutcheons.
3. Install components level and plumb.
4. Install and secure fixtures in place with wall supports, wall carriers (as required) and bolts.
5. Seal fixtures to wall and floor surfaces with sealant.
6. Sink shall be installed using a compression style clip and bolt mount. No snap ring installations will be allowed.
7. Provide offset traps for handicap fixtures in order for piping to fit behind casework.

C. Adjusting and Cleaning:

1. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.
2. At completion clean plumbing fixtures and equipment.

D. Fixture Rough-In Schedule:

1. Rough-in fixture piping connections in accordance with following table of minimum sizes for particular fixtures.

Fixture	Hot Water	Cold Water	Waste	Vent
Water Closet	N/A	1/2"	3"	2"
Urinal	N/A	3/4"	2"	1½"
Lavatory	1/2"	1/2"	1½"	1½"
Water Cooler	N/A	3/8"	1½"	1½"
Sink	½"	½"	1½"	1½"
Shower	½"	½"	1½"	1½"
Hose Bibb	N/A	3/4"	N/A	N/A
Mop Basin	3/4"	3/4"	3"	2"
Floor Drain	N/A	N/A	2"	1½"
Emergency Shower	3/4"	1"	1½"	N/A

3.04 PLUMBING EQUIPMENT

A. Installation:

1. Install water heaters in accordance with manufacturer's instructions and to UL and NFPA requirements.
2. Coordinate plumbing piping, and electrical work to achieve operating system.

3.05 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Prior to starting work, verify system is complete, flushed and clean.

B. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.

C. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.

D. Maintain disinfectant in system for 24 hours.

E. If final disinfectant residual tests less than 25 mg/L, repeat treatment.

F. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

G. Take samples no sooner than 24 hours after flushing, from 5 percent of outlets and from water entry, and analyze in accordance with AWWA C601.

3.06 SERVICE CONNECTIONS

A. Provide connection to sanitary sewer services and domestic water. Before commencing work check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.

B. Provide for connection to existing gas service. Building gas service to have initial minimum pressure of 7 inches wg.

END 15400

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide:
1. Plumbing piping.
2. Plumbing specialties.
3. Plumbing fixtures.
4. Plumbing equipment.
5. Natural Gas piping.
6. Compressed Air piping

1.02 REFERENCES

A. ANSI/ASME B16.3 - Malleable Iron Threaded Fittings Class 150 NS 300.
B. ANSI/ASME Sec. 9 - Welding and Brazing Qualifications.
C. ANSI/ASTM B32 - Solder Metal.
D. ASTM A53 - Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
E. ASTM A120 - Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized), Welded and Seamless, for Ordinary Uses.
F. ASTM B88 - Seamless Copper Water Tube.
G. AWWA C601 - Standard Methods for the Examination of Water and Waste Water.
H. ASTM B306 - Copper Drainage Tube (DWV)
I. ASTM D2680 - Acrylonitrile-Butadiene-Styrene (ABS) Composite-Sewer Piping.
J. ASTM D2751 - Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe and Fittings.
K. ASTM D2665 - Poly Vinyl Chloride (PVC) plastic Drain, Waste, and Vent Pipe and Fittings.
L. ASTM D2729 - Poly Vinyl Chloride (PVC) Sewer Pipe and Fittings.
M. ANSI/ASSE 1011 - Hose Connection Vacuum Breakers.
N. ANSI/ASSE 1019 - Wall Hydrants, Frost Proof Automatic Draining Anti-Backflow Types.
O. ANSI A112.21.1 - Floor Drains.
P. ANSI A112.18.1 - Finished and Rough Brass Plumbing Fixture Fittings.
Q. ANSI A112.19.2 - Vitreous China Plumbing Fixtures.
R. ANSI A112.19.3 - Stainless Steel Plumbing Fixtures.
S. ANSI A112.19.5 - Trim for Water Closet - Bowls, Tanks, and Urinals.
T. ARI 1010 - Drinking Fountains and Self-Contained Mechanically Refrigerated Drinking Water Coolers.
U. ANSI/NFPA 70 - National Electrical Code.

1.03 QUALITY ASSURANCE

A. Each length of pipe fitting, trap, fixture or device used shall be stamped or indelibly marked with the weight and quality thereof, and the makers name or mark.

B. Manufacturer: For each product throughout specified, provide by same manufacturer.

1.04 SUBMITTALS: Submit product data to include, but not limited to materials, finishes, load ratings, and dimensional information.

1.05 STORAGE AND HANDLING: Store and protect products on site to avoid damage.

1.06 WARRANTY. Provide one year parts and labor on all plumbing fixtures and equipment.

A. Water Heater: Five year warranty on defective equipment

B. Water Cooler: Five year warranty on refrigeration portion of equipment.

2. PRODUCTS

2.01 PLUMBING PIPING (See Divisions 02600 & 02700 for Water and Sanitary piping beyond 5 feet from building)

A. Sanitary Sewer Piping, Below Grade:

1. ABS Pipe: ASTM D2661 or D2751. Fittings: ABS. Joints: ASTM D2235, solvent weld.
2. Schedule 40 PVC Pipe: ASTM D2665. Fittings: PVC. Joints: ASTM D2855, solvent weld.

B. Sanitary Sewer and Vent Piping, Above Grade:

1. ABS Pipe: ASTM D2661 or D2751. Fittings: ABS. Joints: ASTM D2235, solvent weld.
2. Schedule 40 PVC Pipe: ASTM D2665. Fittings: PVC. Joints: ASTM D2855, solvent weld.

C. Water Piping, Above Grade:

1. Copper Tubing: ASTM B88, Type L, hard drawn. Fittings: ANSI/ASME B16.23, cast brass, or ANSI/ASME B16.29, wrought copper. Joints: ANSI/ASTM B32, solder, Grade 95TA.
2. Schedule 80 CPVC (CTS): Pressure Class 200, ASTM D 2846. Joints & Fittings: ASTM D 2846, solvent weld ASTM F 493-2010.

D. Water Piping, Below Grade (Under Building):

1. Copper tubing: ASTM B88, Type K, hard drawn. Fittings: ANSI/ASME B16.29, wrought copper. Joints: ANSI/ASTM B32, solder, Grade 95TA.
2. Schedule 80 CPVC (CTS): Pressure Class 200, ASTM D 2846. Joints & Fittings: ASTM D 2846, solvent weld ASTM F 493-2010.

E. Natural Gas Piping, Above Grade:

1. Steel Pipe: ASTM A53 or A120, schedule 40 black. Fittings: ANSI/ASME B163, malleable iron, or ASTM 234, forged steel welding type. Joints: Screwed for pipe two inches and under; ANSI/AWS D1.1, welded for pipe over two inches.

F. Natural Gas Piping, Below Grade:

1. Polyethylene Pipe: ASTM D2513, SDR 11.5. Fittings: ASTM D2683 or ASTM D2513 socket type. Joints: Fusion welded.

G. Compressed Air:

1. Copper Tubing: ASTM B88, Type L, hard drawn. Fittings: ANSI/ASME B16.23, cast brass, or ANSI/ASME B16.29, wrought copper. Joints: ANSI/ASTM B32, solder, Grade 95TA.
2. Galvanized Steel Pipe: ASTM A53 or A120, schedule 40. Fittings: Cast iron Joints: Grooved mechanical couplings.

H. HVAC Condensate piping:

1. Plastic Pipe: ASTM D1785. Schedule 40 PVC; Fittings: PVC, ASTM D2665; Joints: Solvent Weld, ASTM D2564.

I. Flanges, Unions, and Couplings:

1. Pipe Size 2 Inches and Under: 150 psig malleable iron unions for threaded ferrous piping; bronze unions for copper pipe, soldered joints.

2. Pipe Size Over 2 Inches: 150 psig forged steel slip-on flanges for ferrous piping; bronze flanges for copper piping; 1/16 inch thick preformed neoprene bonded to non-combustible material.
3. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.02 PLUMBING SPECIALTIES See Plumbing Fixture Schedule on drawings.

2.03 PLUMBING FIXTURES See Plumbing Fixture Schedule on drawings.

2.04 PLUMBING EQUIPMENT See Plumbing Fixture Schedule on drawings.

3. EXECUTION

3.01 PLUMBING PIPING

A. Preparation:

1. Ream pipe and tube ends. Remove burrs.
2. Remove scale and dirt, on inside and outside, before assembly.
3. Prepare piping connections to equipment with flanges or unions.

B. Installation:

1. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
2. Route piping in orderly manner and maintain gradient.
3. Install piping to conserve building space and not interfere with use of space.
4. Group piping whenever practical at common elevations.
5. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
6. Provide clearance for installation of insulation and access to valves and fittings.
7. Slope water piping and arrange to drain at low points.
8. Establish elevations of buried piping outside the building to ensure not less than 3 ft. of cover.
9. Establish invert elevations, slopes for drainage to 1/8 inch per foot minimum. Maintain gradients.
10. Bury a tracer wire adjacent to all nonmetallic gas piping. Provide access at valve boxes and terminate above ground at each end.

C. Application:

1. Install unions downstream of valves and at equipment or apparatus connections.
2. Install gate or ball valves for shut-off and to isolate equipment.

D. Testing:

1. Test all piping systems in accordance with Illinois Plumbing Code.
2. Test gas piping for leaks before putting into service.

3.02 PLUMBING SPECIALTIES

A. Preparation: Coordinate forming of floor construction to receive drains and clean-outs to required invert elevations.

B. Installation and Application:

1. Install specialties in accordance with manufacturer's instructions to permit intended performance.
2. Extend clean-outs to finished floor or wall surface. Lubricate threaded clean-out plugs with mixture of graphite and linseed oil. Ensure clearance at clean-out for rodding of drainage system.
3. Encase exterior clean-outs in concrete flush with grade.

3.03 PLUMBING FIXTURES

A. Inspection:

1. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.
2. Verify adjacent construction is ready to receive rough-in work of this Section.

B. Installation:

1. Install each fixture with trap, easily removable for servicing and cleaning.
2. Provide chrome plated rigid or flexible supplies to fixtures with stops, reducers, and escutcheons.
3. Install components level and plumb.
4. Install and secure fixtures in place with wall supports, wall carriers (as required) and bolts.
5. Seal fixtures to wall and floor surfaces with sealant.
6. Sink shall be installed using a compression style clip and bolt mount. No snap ring installations will be allowed.
7. Provide offset traps for handicap fixtures in order for piping to fit behind casework.

C. Adjusting and Cleaning:

1. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.
2. At completion clean plumbing fixtures and equipment.

D. Fixture Rough-In Schedule:

1. Rough-in fixture piping connections in accordance with following table of minimum sizes for particular fixtures.

Fixture	Hot Water	Cold Water	Waste	Vent
Water Closet	N/A	1/2"	3"	2"
Urinal	N/A	3/4"	2"	1½"
Lavatory	1/2"	1/2"	1½"	1½"
Water Cooler	N/A	3/8"	1½"	1½"
Sink	½"	½"	1½"	1½"
Shower	½"	½"	1½"	1½"
Hose Bibb	N/A	3/4"	N/A	N/A
Mop Basin	3/4"	3/4"	3"	2"
Floor Drain	N/A	N/A	2"	1½"
Emergency Shower	3/4"	1"	1½"	N/A

3.04 PLUMBING EQUIPMENT

A. Installation:

1. Install water heaters in accordance with manufacturer's instructions and to UL and NFPA requirements.
2. Coordinate plumbing piping, and electrical work to achieve operating system.

3.05 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Prior to starting work, verify system is complete, flushed and clean.

B. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.

C. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.

D. Maintain disinfectant in system for 24 hours.

E. If final disinfectant residual tests less than 25 mg/L, repeat treatment.

F. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

G. Take samples no sooner than 24 hours after flushing, from 5 percent of outlets and from water entry, and analyze in accordance with AWWA C601.

3.06 SERVICE CONNECTIONS

A. Provide connection to sanitary sewer services and domestic water. Before commencing work check invert elevations required for sewer connections, confirm inverts and ensure that these can be properly connected with slope for drainage and cover to avoid freezing.

B. Provide for connection to existing gas service. Building gas service to have initial minimum pressure of 7 inches wg.

END 15400

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid:

1. Contractor provide piping and specialties identified below:
   a. Piping.
   b. Refrigerant.
   c. Moisture and liquid indicators.
   d. Filter-driers.

1.02 REFERENCES

A. ANSI/ARI 495 - Refrigerant Liquid Receivers.

B. ANSI/ARI 710 - Liquid Line Dryers.

C. ANSI/ASHRAE 34 - Number Designation of Refrigerants.

D. ANSI/ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.

E. ANSI/ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes.

F. ANSI/ASME B31.5 - Refrigeration Piping.

G. ASTM B280 - Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.

1.03 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store piping and specialties in shipping containers with labeling in place.

B. Protect piping and specialties from entry of contaminating material by leaving end caps and plugs in place until installation.

2. PRODUCTS

2.01 PIPING

A. Copper Tubing: ASTM B280, Type ACR hard drawn.

1. Fittings: ANSI/ASME B16.22 wrought copper.
2. Joints: ANSI/ASTM B32, solder Grade 95TA.

B. Copper Tubing to 7/8 inch OD: ANSI/ASTM B88, Type k, annealed.

1. Fittings: ANSI/ASME B16.26 cast copper.
2. Joints: Flared.

2.02 REFRIGERANT: ANSI/ASHRAE 34; R410A .

2.03 MOISTURE AND LIQUID INDICATORS: Indicators: Single port type, UL listed, with copper or brass body, flared or solder ends, sight glass, color coded paper moisture indicator and plastic cap; for maximum working pressure of 500 psi, and maximum temperature of 200°F.

2.04 FILTER-DRIERS: Permanent Straight Thru Type: ANSI/ARI 710, UL listed, steel shell with molded desiccant filter core, for maximum working pressure of 350 psi.

3. EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare piping connections to equipment with flanges or unions.

3.02 INSTALLATION

A. Install refrigeration specialties in accordance with manufacturer's instructions.

B. Route piping in orderly manner, with plumbing parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and not interfere with use of space.

D. Group piping whenever practical at common elevations and locations. Slope piping one percent in direction of oil return.

E. Provide non-conducting dielectric connections when joining dissimilar metals.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

G. Provide clearance for installation of insulation and access to valves and fittings.

H. Fully charge completed system with refrigerant after testing.

3.03 APPLICATION

A. Provide line size liquid indicators in main liquid line leaving condenser, or if receiver is provided, in liquid line leaving receiver.

B. Provide permanent filter-drier.

C. Provide refrigerant charging (packed angle) valve connections in liquid line between receiver shut-off valve and expansion valve.

3.04 FIELD QUALITY CONTROL: Test refrigeration system in accordance with ANSI/ASME B31.5.

END 15535

1. GENERAL

1.01 WORK INCLUDED

A. Base Bid:

1. Contractor provide:
   a. Forced-air furnaces with refrigerant cooling coil on unit specified.

1.02 REFERENCES

A. AGA - Directory of Certified Appliances and Accessories.

B. ANSI/AGA 223.1 - National Fuel Gas Code.

C. ANSI/NFPA 70 - National Electrical Code.

D. ARI 210 - Standard for Unitary Air-Conditioning Equipment.

1.03 QUALITY ASSURANCE

A. Conform to requirements of UL and applicable codes.

B. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum of five (5) years experience.

1.04 SUBMITTALS

A. Submit shop drawings and product data, showing dimensions, connections, arrangement, accessories, and controls.

B. Submit manufacturer's installation instructions.

1.05 OPERATION AND MAINTENANCE DATA

A. Submit manufacturer's descriptive literature, operating instructions, and maintenance and repair data.

1.06 WARRANTY

A. Provide ten (10) year parts warranty on heat exchanger portion.

B. Provide one (1) year parts, and labor warranty on the entire unit from the date of substantial completion.

2. PRODUCTS

2.01 FORCED-AIR FURNACE

A. ACCEPTABLE MANUFACTURERS

1. Carrier
2. Lennox
3. Trane

B. General:

1. Provide upflow, fixed capacity, condensing type with natural gas burner with cold air plenum and filter rack.
2. Provide self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, heat exchanger(s), burner, controls, air filter, and refrigerant cooling coil (on specified unit(s)).

C. Fabrication:

1. Cabinet: Galvanized steel with baked enamel finish, easily removed and secured access doors, glass fiber insulation with reflective liner.
2. Heat Exchanger: Aluminized steel, fold and crimp sectional construction.
3. Supply Fan: Centrifugal type, rubber mounted with direct or belt drive, adjustable variable pitch motor pulley.
5. Air Filters: One inch thick glass fiber, disposable type.
6. Gas Burner: Stainless atmospheric type with adjustable combustion air supply, equipped with combustion gas valve and pressure regulator incorporating manual shut-off, pilot valve, automatic 100 percent shut-off, and thermocouple pilot safety device.

D. Burner Operation Controls:

1. Provide low voltage, adjustable room thermostats, to control burner operation to maintain room temperature settings.
2. Provide high temperature limit control and flue gas temperature limit control, to de-energize burner on excessive temperature and energize burner when temperature drops to lower safe value.
3. Provide controls for supply fan in accordance with bonnet temperatures independent of burner controls. Include manual switch for continuous fan operation.
4. Gas Burner Safety Controls: Thermocouple sensor prevents opening of solenoid gas valve until pilot flame is proven and stops gas flow on ignition failure.

E. Evaporator Coil:

1. Mount in factory supplied casing copper tube aluminum fin coil assembly, with galvanized drain pan, drain connection, refrigerant piping connections. Provide transition from furnace supply to casing.
2. Provide factory installed thermostatic expansion valve.

F. Output rating: See Schedule on drawings.

3. EXECUTION

3.01 INSTALLATION

A. Install according to manufacturer's printed instructions.

B. Heaters shall be vented in accordance with manufacturer's recommendations.

C. Provide condensate piping to the nearest floor drain. Piping shall be PVC with glued joints.

3.02 TRAINING

A. General:

1. The Contractor shall provide up to 2 hours of training of Owner designated personnel. Such training shall be for the purpose of teaching the proper operation, and maintenance of the equipment.

B. Training to take place after the equipment is operational.

C. Coordinate training periods with Using Agency.

END 15610

1. GENERAL

1.01 WORK INCLUDED

A. Base Bid:

1. Contractor to provide:
   a. Condensing unit package.
   b. Internal piping and accessories.

1.02 SUBMITTALS

A. Submit with shop drawings, schematic layouts showing condensing units, cooling coils, refrigerant piping, and accessories required for complete system.

B. Submit complete suction and liquid pipe sizing data.

1.03 OPERATION AND MAINTENANCE DATA

A. Submit manufacturer's descriptive literature, operating instructions, and maintenance and repair data.

1.04 WARRANTY: In accord with General Conditions.

A. Manufacturer: Provide five (5) year standard warranty on compressor section of air cooled condensing unit.

B. Provide one (1) year parts, refrigerant, and labor warranty on the entire unit from the date of substantial completion.

2. PRODUCTS

2.01 EQUIPMENT

A. ACCEPTABLE MANUFACTURERS

1. Carrier
2. Lennox
3. Trane

B. General: Factory-assembled, single piece, air-cooled condensing unit suitable for rooftop or ground installation. Contained within the unit enclosure shall be all factory wiring, piping, controls, fan, compressor, and refrigerant charge (R410A).

C. Unit Cabinet:

1. Unit cabinet shall be constructed of galvanized steel, bonderized and coated with a pre-painted baked enamel finish.

D. Fans:

1. Condenser fans shall be direct driven, propeller-type, discharging air vertically upward.
2. Fan blades shall be balanced.
3. Condenser fan discharge shall be equipped with coated steel wire safety guards.
4. Condenser fan and motor shaft shall be corrosion resistant.

E. Compressor:

1. Compressor shall be of the hermetically sealed.
2. Compressor shall be mounted on vibration isolators.

F. Condenser Coil:

1. Condenser coil shall be air-cooled.
2. Coil shall be constructed of aluminum fins mechanically bonded to internally grooved seamless copper tubes.

G. Refrigeration Components: Refrigeration circuit components shall include liquid line service valve, vapor line service valve, liquid filter drier, a full charge of compressor oil, and a system charge of refrigerant (R-410A).

H. Controls and Safeties:

1. Minimum control functions shall include:
   a. Control wire terminal blocks.
   b. Five-minute recycle protection to prevent compressor short-cycling.
   c. Compressor lockout on auto-reset safety until reset from thermostat.
2. Minimum safety devices which are equipped with automatic reset (after resetting first at thermostat), shall include:
   a. High discharge pressure cutout.
   b. Loss-of-charge cutout.

I. Electrical Requirements:

1. Unit shall operate on 1-phase, 60-Hz power at 208 volts.
2. Unit electrical power shall be single-point connection.
3. Unit control circuit shall contain a 24-v transformer for unit control.

J. Performance:

1. See Equipment Schedule on drawings.

3. EXECUTION

3.01 INSTALLATION

A. Complete structural, mechanical, and electrical connections in accordance with manufacturer's installation instructions.

B. Ensure interlock between condensing unit and fan coil.

3.02 ADJUSTING

A. Inspect and test for refrigerant leaks. Repair leaks, put system into operation, and test equipment performance. Replace losses of oil or refrigerant prior to end of correction period.

B. If initial start-up and testing takes place in winter and machines are to remain inoperative, provide start-up and testing operation at beginning of first cooling season.

3.03 TRAINING

A. General:

1. The Contractor shall provide up to 2 hours of training of Owner designated personnel. Such training shall be for the purpose of teaching the proper operation, and maintenance of the equipment.

B. Training to take place after the equipment is operational.

C. Coordinate training periods with Using Agency.

END 15671

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid:

1. Contractor provide:
   a. Electric baseboard heaters.

1.02 REFERENCES: ANSI/NFPA 70 - National Electrical Code.

1.04 SUBMITTALS:

A. Submit product data shall indicate dimensions, weights, capacities, ratings, fan performance, motor electrical characteristics, and gages and finishes of materials.

1.05 OPERATION AND MAINTENANCE DATA: Submit operation and maintenance data.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store and protect units before, during, and after installation from damage to casing by leaving factory shipping packaging in place until immediately prior to final acceptance.

1.07 WARRANTY: Provide one year parts and labor warranty.

2. PRODUCTS

2.01 ELECTRIC CEILING UNIT HEATERS.

A. Acceptable Manufacturers:

1. Berko
2. Brassch
3. Q-mark

B. Description:

1. Electric baseboard heaters suitable for continuous operation.

C. Input voltage: 208 volts, 1 phase, 60 Hz.

D. Output rating: See Schedule on drawings.

E. Heating Element: Multiple corrosion-resistant steel sheathed type elements mechanically bonded to common corrosion-resistant aluminum fins. Fins shall be designed as to block sheath radiation to front and back of heater body and pressure bonded to steel sheath.

F. Provide integral disconnect switch.

H. Provide thermostat.

3. EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.02 TRAINING

A. General:

1. The Contractor shall provide up to 2 hours of training of Owner designated personnel. Such training shall be for the purpose of teaching the proper operation, and maintenance of the equipment.

B. Training to take place after the equipment is operational.

C. Coordinate training periods with Using Agency.

END 15830

1. GENERAL

1.01 WORK INCLUDED

A. Base Bid:
1. Contractor provide gas-fired infrared heating units and controls.

1.02 REFERENCES

A. AGA - Directory of Certified Appliances and Accessories.
B. ANSI/AGA 223.1 - National Fuel Gas Code.
C. ANSI/NFPA 70 - National Electrical Code.

1.03 QUALITY ASSURANCE

A. Conform to requirements of UL and applicable codes.
B. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum of five (5) years experience.

1.04 SUBMITTALS

A. Submit shop drawings and product data showing dimensions, connections, arrangement, accessories, and controls.

1.05 OPERATION AND MAINTENANCE DATA. Submit manufacturer's descriptive literature, operating instructions, and maintenance and repair data.

1.06 WARRANTY. Provide a manufacturers published warranty covering the heater's radiant tube element assembly for a period of five (5) years, and all components utilized in the heater's control assembly for a period of one (1) year.

2. PRODUCTS

2.01 GAS-FIRED INFRARED HEATER

A. Construction:
1. The material used in the heater's combustion chamber shall be 16 gauge aluminized steel, coated with 1200° high temperature corrosion resistant black paint with an emissivity rating of .95.
2. The radiant tube emitter shall be 16 gauge aluminized steel, coated with a 1200° high temperature corrosion resistant black paint with an emissivity rating of .95.
3. The burner control box shall be constructed of enameled steel.
4. The multi-faceted reflectors shall be .025 bright aluminum designed to provide uniform irradiance levels and be adjustable.
5. The fan blower motor shall be protected by a thermal overload switch.
6. The design of the heater shall be such that the components utilized in the heater's control assembly shall be interchangeable from one model to another and easily removed.
7. Heater shall be equipped with a slight glass for visual inspection of silicon carbide ignitor operation and burner flame.
8. Vent caps shall be UL approved and A.G.A. Certified for use with heater.

B. Control System:
1. Heater shall be equipped with a direct silicon carbide glo-bar ignition control system. Power supplied to each heater shall be 120 VAC, 60 Hz, 1 phase.
2. The control system shall be designed to shut off the gas flow to the main burner in the event

of either a main gas supply line or power supply line interruption or failure occurs.

3. Control assembly shall be Certified by A.G.A., shall provide main burner regulation, and shall be of the redundant dual solenoid type.
4. Heater controls shall include two (2) differential pressure switches; one to monitor exhaust back pressure and one to monitor air intake flow.
5. Pre-purge of tubes for 45 seconds prior to firing sequence.

C. Output rating: See Schedule on drawings.

3. EXECUTION

3.01 INSTALLATION

A. Install according to manufacturer's printed instructions.

B. Heaters shall be vented in accordance with manufacturer's recommendations.

3.02 TRAINING

A. General:

1. The Contractor shall provide up to 2 hours of training of Owner designated personnel. Such training shall be for the purpose of teaching the proper operation, and maintenance of the equipment.

B. Training to take place after the equipment is operational.

C. Coordinate training periods with Using Agency.

END 15850

1. GENERAL

1.01 WORK INCLUDES

A. Contractor provide:

1. Roof exhausters.
2. Roof mounted penthouse louvered intake.

1.02 REFERENCES

A. AMCA 99 - Standards Handbook.
B. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.
C. AMCA 261 - Directory of Products Licensed to Bear the AMCA Certified Ratings Seal.
D. AMCA 300 - Test Code for Sound Rating Air Moving Devices.
E. AMCA 301 - Method of Publishing Sound Ratings for Air Moving Devices.
F. NEMA MG1 - Motors and Generators.
G. NFPA 70 - National Electrical Code.
H. UL 705 - Power Ventilators.

1.04 QUALITY ASSURANCE

A. Performance Ratings: Conform to AMCA 210 and bear the AMCA Certified Rating Seal.

B. Sound Ratings: AMCA 301, tested to AMCA 300 and bear AMCA Certified Sound Rating Seal.

C. Fabrication: Conform to AMCA 99.

D. Test and rate performance of louvers in accordance with AMCA 500.

1.05 SUBMITTALS

A. Submit product data including; sound power levels at rated capacity.

1.06 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data including installation instructions, assembly views, lubrication instructions, and replacement parts list.

1.07 DELIVERY, STORAGE, AND HANDLING: Store and protect products.

1.08 WARRANTY. Provide one (1) year labor and material guarantee on roof exhausters.

2. PRODUCTS: See Schedule on drawings.

2.01 ROOF EXHAUSTERS

A. Centrifugal Exhaust Fan: Belt-driven, with spun aluminum housing; resilient mounted motor; 1/2 inch mesh, 16 gage aluminum birdscreen; square base to suit roof curb with continuous curb gaskets; secured with cadmium plated bolts and screws. Premanufactured Curbs: 12 inch high self-flashing with continuously welded seams, built-in cant strip, one inch insulation and curb bottom. Disconnect Switch: Factory wired, non-fusible, in housing for thermal overload protected motor. Backdraft Damper: Motor operated.

2.02 OUTSIDE AIR INTAKE

A. 4 inch deep louvers with blades on 45° slope, heavy channel frame, birdscreen with 3/4" square mesh for intake. Fabricated of 12 gauge extruded aluminum, welded assembly, with factory color anodized finish. Fabricate louvered penthouse with mitered corners and reinforce with structural angles. Backdraft Damper: Motor operated, either line voltage or integral transformer.

3. EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Secure roof exhausters with lag screws to roof curb.

3.02 TRAINING

A. General:

1. The Contractor shall provide up to 2 hours of training of Owner designated personnel. Such training shall be for the purpose of teaching the proper operation, and maintenance of the equipment.

B. Training to take place after the equipment is operational.

C. Coordinate training periods with Using Agency.

END 15870

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid:

1. Contractor provide:
   a. Low pressure ducts, including hangers, drives, cleats and miscellaneous items for a complete installation.
   b. Air inlets and outlets.
   c. Ductwork accessories.

1.02 REFERENCES

A. ASHRAE - Handbook 1993 Fundamentals; Chapter 32 - Duct Design.
B. ASHRAE - Handbook 1992 Equipment; Chapter 16 - Duct Construction.
C. ASTM A 90 - Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.
D. ASTM A 167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
E. ASTM A 525 - General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
F. ASTM A 527 - Steel Sheet, Zinc-Coated (Galvanized) by Hot-Dip Process, Lock Forming Quality.
G. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
H. NFPA 90B - Installation of Warm Air Heating and Air Conditioning Systems.
I. SMACNA - HVAC Duct Construction Standards, Metal and Flexible.
J. UL 181 - Factory-Made Air Ducts and Connectors.
K. ADC 1062 - Certification, Rating and Test Manual.
L. AMCA 500 - Test Method for Louvers, Dampers and Shutters.
M. ARI 650 - Air Outlets and Inlets.
N. ASHRAE 70 - Method of Testing for Rating the Air Flow Performance of Outlets and Inlets.

1.03 QUALITY ASSURANCE

A. Test and rate performance of air outlets and inlets in accordance with ADC Equipment Test Code 1062 and ASHRAE 70.

B. Test and rate performance of louvers in accordance with AMCA 500.

1.04 REGULATORY REQUIREMENTS: Construct ductwork to NFPA 90A and NFPA 90B.

1.05 SUBMITTALS

A. Submit product data including schedule of outlets, inlets and terminal units indicating type, size, location, and application, and noise level.

B. Review requirements of outlets and inlets as to size, finish, and type of mounting prior to submitting product data and schedules of outlets and inlets.

2. PRODUCTS

2.01 DUCTWORK

A. Materials:

1. General: Non-combustible or conforming to requirements for Class 1 air duct materials, or UL 181.

2. Steel Ducts: ASTM A525 or ASTM A527 galvanized steel sheet, lock-forming quality, having zinc coating of 1.25 oz. per sq. ft. for each side in conformance with ASTM A90.
3. Insulated Flexible Ducts: Flexible duct wrapped with flexible glass fiber insulation, enclosed by seamless aluminum pigmented plastic vapor barrier jacket; max. 0.23 K value at 75° F.
4. Fasteners: Rivets, bolts, or sheet metal screws.
5. Sealant: Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.
6. Hanger Rod: Steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

B. Low Pressure Ductwork (½" to 2" wg, less than 2,000 fpm):

1. Fabricate and support in accordance with SMACNA Low Pressure Duct Construction Standards and ASHRAE handbooks, except as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
2. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except by written permission.
3. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide single thickness turning vanes.
4. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Divergence upstream of equipment shall not exceed 30 degrees; convergence downstream shall not exceed 15 degrees.
5. Provide easements where low pressure ductwork conflicts with piping and structure. Where easements exceed 10 percent duct area, split into two ducts maintaining original duct area.
6. Connect flexible ducts to metal ducts with draw bands.
7. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.
8. Use double nuts and lock washers on threaded rod supports.

2.02 AIR INLETS AND OUTLETS

A. See Grille, Register, and Diffuser Schedule on the drawings.

2.03 FLEXIBLE DUCT CONNECTIONS

A. Fabricate in accordance with SMACNA Low Pressure Duct Construction Standards, and as indicated.

B. UL listed fire-retardant neoprene coated woven glass fiber fabric to NFPA 90A, minimum density 20 oz per sq yd, approximately 2 inches wide, crimped into metal edging strip.

2.04 BACKDRAFT DAMPERS

A. Horizontal mounted type frame shall be 18 gauge galvanized steel. Damper blades shall be 0.025 roll formed aluminum with felt seals on closing edge. Axles shall be 3/16" diameter zinc plated steel, mounted in acetyl bushings. Spring assist on initial opening.

2.05 AIR TUNING DEVICES: Multi-blade device with blades aligned in short dimension; steel or aluminum construction; with individually adjustable blades, mounting straps.

3. EXECUTION

3.01 DUCTWORK

A. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

B. Connect diffusers or troffer boots to low pressure ducts with 5 feet maximum length of flexible duct. Hold in place with strap or clamp.

C. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

D. Install in accordance with SMACNA standards.

E. Seal all penetrations with caulk or fill with fiberglass insulation.

F. Duct straps shall not be allowed for ducts larger than 18" wide, or laboratory exhaust duct. Beam clamps or unistrut hung from structure shall be used. Duct straps shall not be screwed into the bottom of the roof deck.

G. Duct straps shall be screwed into the side of the flute of the metal deck.

3.02 DUCTWORK ACCESSORIES

A. Install accessories in accordance with manufacturer's instructions.

B. Provide balancing dampers at points on low pressure supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing.

C. Provide backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated

3.03 AIR INLETS AND OUTLETS

A. Install items in accordance with manufacturers' instructions.

B. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.

C. Install diffusers to ductwork with air tight connection.

END 15880

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid:

1. Contractor to provide:
   a. Complete system of automatic controls, including programmable thermostats, wiring, etc. for furnace/condensing units.

1.02 SUBMITTALS

A. Submit shop drawings and product data including wiring diagram and programming guide.

2. PRODUCTS

2.01 GENERAL

A. Furnish and install products as required to provide a complete control system. This includes, but is not necessarily limited to the following: sensors, controller, wiring, raceway, etc.

2.02 THERMOSTAT/CONTROLLER (Furnace/Condensing Unit combination)

A. Controller shall be low voltage 24 VAC, with digital temperature, with subbase for heating and cooling (HEAT-AUTO-COOL) and fan switch (ON-AUTO), and include 7-day programable (Mon.-Fri., Sat., Sun.) 40° - 80° F degree range.

B. Controllers shall include contacts for controlling fan coil/condensing unit combination.

2.03 THERMOSTAT/CONTROLLER (Infra-red Heaters)

A. Controller shall be low voltage 24 VAC, with digital temperature, with subbase for heating only, and include 7-day programable (Mon.-Fri., Sat., Sun.) 40° - 80° F degree range.

B. The controller for Infra-red heater #21 shall be a waterproof unit.

3. EXECUTION

3.01 INSTALLATION

A. Equipment: Install all system components and appurtenances in accord with the manufacturer's printed instructions.

B. Do not install conduit on roof surfaces unless specifically indicated on drawings.

C. Mount controllers 48" A.F.F., unless otherwise noted.

3.02 TRAINING

A. General:

1. The Contractor shall provide up to 2 hours of training of owner designated personnel. Such training shall be for the purpose of teaching the following:

a. System architecture.
b. Purposes and features of individual system components.
c. Overview of all control and related programs in the system.
d. Proper operation, maintenance and troubleshooting of the system.

2. One of the requirements for Substantial Completion on this project is that all training be complete.

B. Training to take place after the system is operational to the extent that realistic instruction can take place using the front end equipment and distributed control units.

C. Coordinate training periods with owner.

D. Contractor shall provide printed materials which illustrate and explain the discussion topics.

END 15950

1. GENERAL

1.01 WORK INCLUDES:

A. Base Bid: Contractor shall provide testing, adjusting and balancing of air system.

1.02 JOB CONDITIONS

A. Heating, ventilating, air conditioning equipment shall be completely installed and in continuous operation to accomplish the testing, adjusting and balancing work specified.

B. Perform testing, adjusting and balancing when outside conditions approximate design conditions for heating and cooling functions or when system is operating at design capacity.

1.03 QUALITY ASSURANCE

A. Only qualified personnel shall perform testing and balancing work.

B. Submit evidence that the personnel who will preform the testing and balancing of the project systems are qualified personnel for review and approval.

C. Perform all corrective measures caused by faulty installation. Retest, readjust and rebalance system until satisfactory results are achieved.

1.04 DEFINITION

A. Qualified personnel are Personnel who have been certified by one of the following organizations:

1. AABC-Associated Air Balance Council.
2. Certified TBAB-Certified Testing, Balancing and Adjusting Bureau.
3. NEBB-National Environmental Balancing Bureau, Illinois Chapter.
4. SMARTA-Sheet Metal, Air Conditioning & Roofing Contractors Trade Association of Illinois.
5. TABIC-Test and Balancing Institute for Certification.

1.05 SUBMITTALS

A. Submit a report containing all test data and other related information recorded during testing and balancing, placed on appropriate forms for Architect/Engineer review and approval. Reports shall certify that the methods used and results achieved are as specified.

B. Provide reports in letter size, 3-ring binder manuals, complete with index page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets, and indicating humidistat and thermostat locations.

1.06 REPORT FORMS

A. Forms shall include the following information:

1. Title Page:
   a) Company name.
   b) Company address.
   c) Company telephone number.
   d) Project name.

e) Project location.
f) Project architect.
g) Project engineer.
h) Project contractor.
i) Project altitude.

2. Instrument List:
   a) Instrument.
   b) Manufacturer.
   c) Model.
   d) Serial number.
   e) Range.
   f) Calibration date.

3. Air Moving Equipment:
   a) Location.
   b) Manufacturer.
   c) Model.
   d) Air flow, specified and actual.
   e) Outside air flow, specified and actual.
   f) Total static pressure (total external), specified and actual.
   g) Inlet pressure.
   h) Discharge pressure.

4. Air Distribution Test Sheet:
   a) Air terminal number.
   b) Room number/location.
   c) Terminal type.
   d) Terminal size.
   e) Area factor.
   f) Design velocity.
   g) Design air flow.
   h) Test (final) velocity.
   i) Test (final) air flow.
   j) Percent of design air flow

2. PRODUCTS

2.01 TESTING EQUIPMENT

A. Provide instruments required for testing, adjusting, and balancing operations. Make instruments available to Engineer or Engineer's representative to facilitate spot checks during testing.

B. Provide additional balancing instruments as required.

3. EXECUTION

3.01 EXAMINATION

A. Verify that systems are complete and operable before commencing work. Ensure the following conditions are met:
   1. Systems are started and operating in a safe and normal condition.

2. Temperature control systems are installed complete and operable.
3. Proper thermal overload protection is in place for electrical equipment.
4. Final filters are clean and in place.
5. Duct systems are clean of debris.
6. Fans are rotating correctly.
7. Fire and smoke dampers are in place and open.
8. Air coil fins are cleaned and combed.
9. Access doors are closed and duct end caps are in place.
10. Air outlets are installed and connected.
11. Duct system leakage is minimized.

B. Report any defects or deficiencies noted during performance of services to A/E.

3.02 INSTALLATION TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

C. Exhaust Fans: Adjust to within plus or minus 10 percent of design.

3.03 ADJUSTING

A. Ensure recorded data represents actual measured or observed conditions.

B. Permanently mark settings of valves, dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.

C. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.

D. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

E. At final inspection, recheck random selections of data recorded in report.

3.04 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to provide required or design supply, return, and exhaust air quantities. Perform this work with cooling system energized where applicable to obtain the extra resistance of wet coils.

B. Make air quantity measurements in ducts by Pitot tube traverse of entire cross sectional area of duct.

C. Measure air quantities at air inlets and outlets.

D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

E. Use volume control devices to regulate air quantities only to extend that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices.

F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary

branch air quantities by damper regulation.

G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.

H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan. Make allowances for dirty filters.

I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.

J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.

K. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches positive static pressure.

3.02 REPORT SUBMITTAL

A. Fill in test results on appropriate forms.

B. Submit three (3) certified copies of test reports for approval.

C. Include in the report a list of instruments used and the last date of calibration.

3.03 SCHEDULE

A. Equipment requiring TAB work:

1. Furnace.
2. Grilles, registers, and diffusers.

END 15993

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid:

1. Contractor provide raceway and wiring for electrical power distribution, lighting system.

2. Conduit and boxes for security cameras, telephone, and data (internet) systems.

1.02 SYSTEM DESCRIPTION

A. Basic materials include:

1. Raceways.
2. Fittings.
3. Wire and Cables.
4. Boxes.
5. Wiring Devices.
6. Supporting Devices.

B. Provide all new materials, without blemish or defect, in accord with standards specified and listed or labeled by a nationally recognized independent testing lab.

1.03 REFERENCES

A. ANSI C80.1 - Specification for Rigid Steel Conduit, zinc coated.
B. ANSI C80.3 - Specification for Electrical Metallic Tubing, zinc coated.
C. ANSI C80.4 - Specification for Fittings for Rigid Metal Conduit and EMT.
D. ANSI/NEMA FB1 - Fittings and Supports for Conduit and Cable Assemblies.
E. ANSI/NEMA OS-1 - Sheet Steel Outlet Boxes, Device Boxes, Covers and Box Supports.
F. NEMA TC-2 - Electrical Conduit.
G. NEMA WC-3 - Rubber Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.
H. NEMA WC-5 - Thermoplastic insulated wire and cable for the transmission and distribution of electrical energy.
I. UL44 - Rubber-Insulated Wires and Cables.
J. UL83 - Thermoplastic-Insulated Wires and Cables.
K. UL493 - Thermoplastic-Insulated Underground Feeder and Branch Circuit Cables.
L. UL884 - Underfloor Raceways and Fittings
M. NEMA 250 Enclosures for Electrical Equipment.
N. UL50 - Cabinets and Boxes.
O. UL514 - Outlet Boxes.
P. NEMA WD-1, WD-5 - General Purpose Wiring Devices.
Q. NEMA WD-5 - Specific-Purpose Wiring Devices.

1.04 DELIVERY, STORAGE AND HANDLING

A. Material shall be suitably packaged by manufacturer to prevent damage during shipment. Damaged materials will not be acceptable for use.

B. Store materials on site in clean, dry storage area; when outside, elevated above grade and enclosed with durable watertight wrapping.

C. Handle all materials carefully to prevent damage. Minor scratches, marks or blemishes to finish shall be repaired to satisfaction of Architect/Engineer.

2. PRODUCTS

2.01 RACEWAYS

A. Conduit (see 3.02 B):

1. Steel Rigid Metal. ANSI C80.1.
2. Steel Flexible Metal. UL-1.
3. Steel Liquid-tight Flexible. UL-1.
4. Rigid Nonmetallic, NEMA TC-2, PVC, Schedule 40.

B. Tubing:

1. Steel Electrical Metallic. Comply with ANSI C80.3.

2.02 FITTINGS

A. Rigid:

1. Locknuts: Steel or malleable iron.
2. Bushings: Insulating or insulated throat type.
3. Couplings: Threaded type.

B. Electrical Metallic Tubing:

1. Couplings and Connectors: Steel Compression type.

C. Flexible:

1. Connectors; malleable iron, threadless, squeeze clamp type for non-jacketed conduit.
2. Connectors; steel or malleable iron compression type with insulated throat and "O" ring assembly for liquid-tight conduit.

2.03 BUILDING WIRE (all copper)

A. Feeders and Branch Circuits: Copper, 98% conductivity, 600 volt insulation, THW, THWN, XHHW, or dual rated THHN/THWN complying with US-83; #8 and larger, stranded conductor; wire thru #10, solid or stranded conductor.

B. Branch Circuit Wiring: Conductors sized in accord with N.E.C. 75°c ampacity tables but not less than No. 12 AWG. Increase size when farthest outlet is greater than 75 feet from panelboard.

C. Wiring for Systems Other Than Power: Comply with system manufacturer's standards. No. 14 AWG unless otherwise specified.

D. Color code conductors to designate neutral and phase.

2.04 BOXES

A. Pull Boxes and Junction Boxes:

1. NEC 2014 - Article 314
2. Surface Mounted Boxes: Screw-on or hinged cover. Provide silicon bronze standard retaining screws where accessible only to authorized personnel; security type in all other locations. Spaced twelve (12) inches maximum.
3. Boxes of 14 gauge steel minimum, galvanized or prime coated in finished areas.
4. Cast Metal Boxes for Outdoor and Wet Locations: NEMA 250; Type 4 and Type 6, flat-flanged, surface-mounted junction box, UL listed as watertight. Cast aluminum box and

cover with ground flange, neoprene gasket, and stainless steel cover screws.

5. Exterior junction boxes: Polymer concrete construction with gasketed lid labeled "ELECTRIC". Interior size to be 24" x 24"x 8" minimum. Lid and box to be rated at 8000 lbs. minimum. Lids to have (2) stainless steel safety screws in cover to prevent unauthorized entry. Open bottom.

B. Outlet Boxes:

1. Hot dipped galvanized, 1.25 oz./sq. ft., sherardized or cadmium plated.
2. Interior Boxes: Sheet steel with conduit knockouts, attached lugs for locating.
3. Exterior Boxes or Exposed Interior in Wet/Damp Locations: Cast aluminum, deep type, corrosion proof fasteners, watertight, gasketed, threaded hubs.
4. For Suspended or Surface Mounted Fixtures:
   a. Four (4) inch octagonal or square according to devices used, minimum of 1½" deep boxes for poured concrete ceilings. Furnished with fixture studs. Installed with ¾" minimum depth plaster rings on suspended ceilings. 4" octagonal or square for all exposed conduit work with fixture extension pan or deep fixture canopy to enclose the box. Use #14 stranded, type AF, 300 volt wire in pipe pendants.
   b. Four (4) inch octagonal or square two-gang box according to devices used, minimum of 2½" deep, 3 ½" deep for 1" conduit, boxes for masonry wall.
5. For Recessed Fixtures:
   a. Four (4) inch octagonal or square. A minimum of 1½" deep. Complete with blank cover. Wire in Greenfield: #12 type THHN, 600 volt.
6. Switch and Receptacle Boxes:
   a. Wall - 4" square for up to two devices. Solid gang boxes for over two devices. Complete with ¾" minimum depth tile ring where used in exposed tile, concrete, block or paneled walls. Complete with ¾" minimum depth plaster ring where used in plastered walls. Install with ½" raised galvanized device covers where used for exposed conduit work.
7. Provide corrosion resistant steel knockout closures for unused openings.

2.05 WIRING DEVICES

A. Wall Switches:

1. 120 v., quiet, slow make, slow break design, toggle handle, totally enclosed case, rated 20 a., specification grade. Equivalent 2 pole, 3-way and 4-way switches.
2. Switch and Pilot Light: Toggle type with integral long-life pilot, rated 20 a., 120v.
3. Color: White.
4. All switches shall be specification grade and shall be manufactured by Arrow-Hart, Pass & Seymour, Leviton, or Hubbell.
5. Color: White.

B. Receptacles:

1. Standard Duplex: Full gauge size, polarized, parallel blade, U-grounding slat, spec. grade, rated 20 a., 125 v., NEMA line 5, designed for split feed service.
   a. Color: White.
2. Isolated Ground: Full gauge size, polarized, parallel blade, U-grounding slat, spec. grade, rated 20a., 125 v., NEMA line 5, designed for split feed service. Grounding terminal isolated from mounting strap and conduit.
   a. Color: Orange.
3. 208 & 240 V receptacles: Full gauge size, spec. grade. Verify NEMA type and rating with equipment to be installed.

C. Ground Fault Circuit Interrupter:

1. General duty feed thru type capable of protecting downstream receptacles on single circuit, grounding type, UL Class A, Group 1, 20 a., rating, 125 v.
2. Solid state ground fault sensing and signaling, 5 ma. ground fault trip level.
3. Wallplate compatible with receptacle configuration.
4. Seal all connections with seal coat compound and wrap two layers tape.
5. Color: White.

D. Covers:

1. Materials: Nylon, smooth, high abuse, color to match device.
2. Plates:
   a. Flush Mounting: Bevelled type with smooth rolled outer edge.
   b. Surface: Bevelled, steel, pressure formed for smooth edge to fit box.
   c. Weatherproof: Weatherproof covers to be listed as “weatherproof while in use”. Cast metal, gasketed.

2.06 SUPPORTING DEVICES

A. Suspended Conduits Less than 1":

1. For exposed construction, provide strap type hangers supported from beam clamps or threaded rods.
2. For conduits suspended above ceilings, anchor to building structural steel. When span exceeds NEC limits, provide channel steel between framing members. Tie wiring of conduit to air ducts, or other piping not permitted. Plumber's perforated strap not permitted.

B. Suspended Conduit 1" or larger.

1. Provide threaded rod with "U" type hangers for single conduit.
2. Anchor threaded rod to inserts in concrete or beam clamp on steel structure.
3. Provide trapeze hanger assemblies and threaded rod for two or more conduits.

C. Surface Mounted Conduit:

1. Provide one-hole galvanized steel straps for conduits 1" or less.
2. For conduit larger than 1", use malleable iron pipe straps.
3. For multiple conduits, provide channel anchored to wall with conduit attached to channel with split pipe clamps.

D. Anchoring:

1. Hollow Masonry: Toggle bolts or spider type expansion anchors.
2. Solid Masonry: Lead expansion anchors or preset anchors.
3. Concrete: Self-drilling anchor or power driven studs.
4. Metal: Machine screws, bolts or welded studs.
5. Wood: Wood screws.

2.07 SURFACE RACEWAY & ACCESSORIES FOR EXISTING BUILDING EXPOSED.

A. Surface raceways:

1. One piece latching nonmetallic raceway.
2. Provide necessary mounting accessories, adapters, and hardware for surface raceway system.
3. Color: white

3. EXECUTION

3.01 INSTALLATION

A. Cooperate with other contractors engaged in project. Execute work in a manner not to interfere with other contractors.

B. Coordinate work with other contractors regarding location and size of pipes, raceways, ducts, openings, switches, outlets, so there is no interference between installation or of progress of any contractor.

C. Install all equipment with ample space allowed for removal, repair, or changes to equipment. Provide ready accessibility to removable parts of equipment and to all wiring without moving equipment installed or already in place.

D. Where cutting is required to facilitate construction, patch and repair, cut items to original state. Do not cut structural work without prior written approval of Architect/Engineer.

E. Cut holes through concrete and masonry with a diamond core drill or concrete saw. Pneumatic hammer, impact, electric, hand or manual hammer type drills not allowed, except where permitted by Architect/Engineer because of limited working space.

F. Make floor, exterior wall and roof seals watertight. Sleeve walls and floors which are cored for installation of conduit with steel tubing, grouted and space between the conduit and sleeve fill as specified herein.

G. At project completion, clean all equipment to the original finish. Remove all shipping labels.

3.02 CONDUIT

A. Conduit Schedule. Minimum Conduit Size: 3/4" unless otherwise specified. Install switch legs in ½" conduit where in accordance with NEC.

B. Install conduit as follows:

1. Use EMT conduit for branch circuits in partitions and drop ceiling areas and telephone and data systems.
2. Use flexible conduit as herein specified.
3. Use Sch. 40 PVC conduit for underground applications.
4. Use rigid steel for all conduit larger than 2" trade size in floor slabs. All conduit in slabs larger than 2" diameter shall be rigid steel, rigid schedule 40 PVC may be used beneath slabs. Sch. 40 PVC conduit may be used for conduit smaller than 2" trade size in floor slabs.
5. EMT with steel compression fittings is acceptable in masonry walls.
6. Sch. 40 PVC conduit may be used for conduit below floor slabs.

C. Conduit Runs:

1. Size all conduit as indicated on Drawings; where not shown, in accordance with National Electrical Code. Make all conduit systems mechanically and electrically continuous from source of current to all outlets, and ground in accordance with the National Electric Code.
2. Conceal conduit wherever possible, or expose as shown or noted on the drawings and as specified herein. Run all exposed conduit parallel to building walls using right angle bends. Exposed diagonal runs of conduit will not be permitted. Do not install conduit on roof surfaces unless specifically indicated on drawings.
3. Ream conduit after threads are cut. Cut ends square and butt solidly into couplings.
4. Prevent the accumulation of water, foreign matter or concrete in the conduits during execution of work. Temporarily plug conduit, blowout and swab before wires are pulled.

5. Fasten conduits to all sheet metal boxes and cabinets with two (2) locknuts, in accord with NEC, where insulated bushings are used and where bushings cannot be brought into firm contact with the metal enclosures; otherwise, use at least a single locknut and bushing.
6. Seal each underground joint and make watertight.
7. Where building construction or other conditions make it impossible to use standard threaded couplings, install watertight threaded unions.
8. Make changes in direction of runs with symmetrical bends or cast-metal fittings. Make field-made bends and offsets with conduit bending machine to avoid changing the internal diameter of the conduit and not damage its protective coating either inside or outside. Individual bends shall not exceed 90○ and not more than 270○ total bends will be allowed in any one conduit run. Where more bends are necessary and conduit runs exceed 150 lin. ft., install a suitable pull box or junction box.
9. Provide empty conduits installed with a pull-line. Use pull-line of plastic having not less than 200 lb. tensile strength. Leave not less than 12" of slack at each end of pull-line.
10. Use flexible conduit for final connection to motors, portable equipment and for equipment subject to vibration and noise transmission. For conduit sizes up to 1" trade size, use minimum length of 12" and maximum length of 36"; for conduit sizes above 1" trade size, use minimum length of 20" and maximum length of 48".
11. Use flexible metal conduit to connect light fixture to adjacent junction boxes where not an integral part of the light fixture. Flexible conduit shall be a minimum 3/8" trade size, minimum 4 ft. long and maximum 6 ft. long.

3.03 WIRE AND CABLE

A. Make conductors continuous from outlet to outlet. Do not make splices except in outlet or junction boxes. Make all feeder cables continuous from origin to panel or equipment terminations without running splices in intermediate pull or boxes, unless specifically indicated on the Drawings or approved in writing by Architect/Engineer.

B. Do not exceed conduit fill established by the National Electrical Code for number of conductors installed in a raceway.

C. Use minimum wire sizes in no case less than shown on the drawings or specified herein:

1. Control and Signal: #14 AWG.
2. Branch Circuits:
   a. Where the farthest outlet of a single 120 v. or 208 v. branch circuit is less than 75 ft. from panelboard, use #12 AWG wire between all outlets and for home run of that circuit.
   b. Where the farthest outlet of a circuit is more than 75 ft. from panelboard, use #10 AWG wire for home run of that circuit and #12 AWG wire between all other outlets, except where larger sizes are indicated.

D. Do not pull any cable or wire in a raceway until conduit system is complete and internal raceway has been cleaned. Strain on cables shall not exceed manufacturer's recommendations during pulling. Use pulling lubricant, compatible with insulation and covering, that will not cause deterioration of insulation or jacket covers of cables or conductors. Use pulling lubricant recommended by wire manufacturer.

E. Provide each cable or conductor in panels, pullboxes or troughs with a permanent pressure-sensitive label with suitable numbers or letter for identification.

F. Provide wires and cables entering equipment or panels with enough slack to eliminate stretched, angular connection. Neatly arrange wiring, bundle and fan out to termination panels. Make minimum bending radius for conductors in accord with National Electrical Code.

G. Support all conductors in vertical raceways in accord with National Electrical Code.

H. Leave at least 6" loops or ends at each outlet for installation of devices or fixtures. Roll up all wires in outlet boxes not for connection to fixture or device at that outlet, connect together and tape.

I. Upon completion of wire installation, but before termination to equipment, test each wire for grounds and short circuits. Replace or correct defective wiring.

3.04 BOXES

A. Location of proposed outlets shown on the drawings is diagrammatic only. Coordinate exact location of outlets in field with architectural details, equipment connection requirements and work of other contractors. Architect/Engineer may alter the location of outlets shown within a six feet radius prior to installation.

B. Protect all outlet boxes from entry of foreign materials.

C. Independently support all boxes. No parts of the weight or stress thereof shall be borne by conduits terminating therein.

D. Install suitable pull boxes in convenient intermediate locations in all conduits runs requiring more than three-90○ bends.

E. Plug all unused openings. Use snap-in metal plugs for sheet metal boxes.

F. In all common boxes used for gang installation with switches, receptacles and low voltage devices, include barriers between the devices, switches or receptacles.

G. Provide permanent barriers in common boxes to limit voltage between adjacent switches to 300 v. or less.

H. Height of outlets and devices is indicated on the drawings. Use the following as a guide for mounting of outlet boxes:

	Device	Height Above Finished Floor to Bottom of Box
1.	Receptacles	16"
2.	Switches	44"
3.	Telephone/Communication Outlet	16" (unless otherwise noted)

I. Coordinate height of outlets with drawings and equipment installations drawings and properly locate height of all outlets.

3.05 DEVICES

A. Flush mount all switches and receptacles where possible. Fit all flush type outlets with device plate that completely conceals opening. Use multiple gang plates where several devices are grouped.

C. Connect wiring device grounds in accordance with NEC.

D. Locations shown are approximate. Determine exact locations at site by reference to building drawings and in conjunction with work by other crafts.

3.06 RACEWAY SUPPORTS AND HANGERS

A. Securely fasten raceways in place and support from ceiling or walls at spacings not exceeding:

	Material	Max. Spacing of Supports
1.	½" thru 1" Trade Size Conduit	6 ft.
2.	1¼" thru 1½" Trade Size Conduit	8 ft.
3.	2" thru 4" Trade Size Conduit	10 ft.
4.	Flexible Metal Conduit	4½ ft.

B. Support rigid or EMT conduits within 3 ft. of every outlet box, junction box, pull box, cabinet or termination. Support flexible conduit within 12" of every outlet box or fitting.

C. Support conduits by pipe straps, wall brackets, hangers, or ceiling trapeze. The use of perforated iron or wire for supporting conduits is prohibited. Fasten with wood screws or screw nails to wood; use toggle bolts or hollow wall fasteners in hollow masonry, plaster or gypsum board partitions and walls; self-drilling anchors or expansion anchors on concrete surfaces; sheet metal screws in sheet metal studs.

D. Do not fasten supports to piping, ductwork, mechanical equipment or conduit.

E. The load applied to fasteners or hangers shall not exceed one-third the proof test load of the fasteners or hangers.

F. For fasteners attached to concrete, use vibration and shock resistant type.

G. Where two or more conduits 1" trade size or larger run parallel, trapeze hangers may be used consisting of threaded solid rods, washers, nuts and galvanized "L" angle or channel iron. Individually fasten conduits to the cross member of every other trapeze hanger with one hole straps or clamp backs with proper size bolts, washers and nuts. When adjustable trapeze hangers are used, use U-bolt type clamps at end of conduit runs, at each elbow and at each third intermediate hanger to fasten each conduit.

H. Make hangers of durable materials suitable for the application involved.

I. All screws, bolts, washers and miscellaneous hardware used for conduit supports shall be fabricated from rust-resisting metal. Trapeze hangers shall have hanger assemblies protected with galvanized finish.

END 16050

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide electrical connections to equipment shown on drawings.

2. PRODUCTS

Not used

3. EXECUTION

3.01 INSPECTION: Verify that equipment is ready for electrical connection, wiring, and energization.

3.02 PREPARATION: Review equipment submittals prior to installation and electrical rough-in. Verify location, size, and type of connections. Coordinate details of equipment connections with supplier and installer.

3.03 INSTALLATION

A. Use wire and cable with insulation suitable for temperatures encountered in heat-producing equipment.
B. Make conduit connections to equipment using flexible conduit. Use liquid-tight flexible conduit in damp or wet locations.
C. Install pre-finished cord set where connection with attachment plug is indicated or specified, or use attachment plug with suitable strain-relief clamps.
D. Provide suitable strain-relief clamps for cord connections to outlet boxes and equipment connection boxes.
E. Make wiring connections in wiring compartment of pre-wired equipment in accordance with manufacturer's instructions. Provide interconnecting wiring where indicated.

END 16180

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide nameplates, tape labels, wire and cable markers, and panel schedules.

2. PRODUCTS

2.01 MATERIALS

A. General:

1. Nameplates and Labels:
   a. Type: Laminated engraved plastic identification labels.
   b. Colors: White with black recessed letters, attached with adhesive or screws.
   c. Labels shall include complete identification of equipment including area served, identifying numbers and names used on drawings (i.e., "Lighting Panel", "Power Panel", "Main Distribution Panel MDP-1").
   d. Labels on electrical panels shall include voltage characteristics.
2. Electrical wire marker tape:
   a. Listed: UL 510.
   b. Type: 5.5 mil epoxy film type.
   c. Acrylic pressure sensitive.
   d. High tack adhesive.

3. EXECUTION

3.01 INSTALLATION

A. Degrease and clean surfaces to receive nameplates.

B. Install nameplates parallel to equipment lines.

C. Secure nameplates to equipment fronts using screws, rivets or adhesive.

D. Install labels on TT switches and panelboard.

E. Provide a typed card directory for each panel. Directory shall designate breaker number and load served and shall be mounted inside front cover doors under glass or plastic. Panel shall have all breakers individually numbered and panel shall have an interior nameplate provided by manufacturer with voltage, amperage, phase and hertz listed.

F. Embossed tape will not be permitted for any application.

3.02 WIRE IDENTIFICATION: Provide wire markers on each conductor in panelboard and load center gutters, pull boxes, outlet and junction boxes, and at load connection. Identify with branch circuit and feeder number for power and lighting circuits.

3.03 NAMEPLATE ENGRAVING SCHEDULE: Provide nameplates to identify all electrical distribution and control equipment. Letter Height: 1/4" for distribution and control equipment identification.

END 16195

1. GENERAL

1.01 WORK INCLUDED

A. Base Bid: Contractor provide disconnect switches, fuses and enclosures for same.

1.02 REFERENCES

A. ANSI/UL 198C - High-Intensity Capacity Fuses; Current Limiting Types.

B. ANSI/UL 198E - Class R Fuses.

C. FS W-F-870 - Fuseholders (For Plug and Enclosed Cartridge Fuses).

D. FS W-S-865 - Switch, Box, (Enclosed), Surface-Mounted.

E. NEMA KS 1 - Enclosed Switches.

1.03 SUBMITTALS

A. Submit product data including outline drawings with dimensions, and equipment ratings for voltage, capacity, horsepower, and short circuit.

2. PRODUCTS

2.01 DISCONNECT SWITCHES

A. Fusible Switch Assemblies: NEMA KS 1; Type HD; quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position. Fuse Clips: FS W-F-870.

B. Nonfusible Switch Assemblies: NEMA KS 1; Type HD; quick-make, quick-break, load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position.

C. Enclosures:
   a. Outdoor: NEMA 3R
   b. Indoor: NEMA 1

2.02. CIRCUIT AND MOTOR DISCONNECTS

1. Heavy-duty enclosed safety switch, surface mounted, fusible or non-fused as specified, rated at 600 v., U.L. listed.
2. Quick-make, quick-break mechanisms, position of blades visible with cover open.
3. Operating handle integral part of enclosure base with position easily identified, handle lockable in "OFF" position with padlocks. Handle interlocked to prevent opening of front cover with switch in "ON" position.
4. Meet NEMA Enclosed Safety Switch Standard KS-1 for H.D. type.
5. Current carrying parts of high conductivity copper with silver-tungsten type contact surfaces.
6. Positive pressure reinforced fuse clips for fused type.
7. Enclosures:
   a. Outdoor: NEMA 3R
   b. Indoor: NEMA 1

2.03 FUSES

A. Fuses: ANSI/UL 198C, Class J; Class RK1; dual element, current limiting, time delay, one-time fuse,

250- 600 volt.

B. Interrupting Rating: 200,000 rms amperes.

3. EXECUTION

3.01 INSTALLATION

A. Install disconnect switches where indicated on Drawings.

B. Install fuses in fusible disconnect switches.

C. Disconnects and Starters:

1. Supply motor or load from individual branch circuit in separate branch conduit except where otherwise shown.
2. Make all final connections to motors with flexible conduit, not less than 18" or more than 24" long. Provide ground wire to motor frame. Adequately support conduit at each motor.
3. Verify proper direction of rotation of all motors.
4. Provide nameplates or legends indicating equipment served or the function of all disconnects, combination starters, and control devices furnished by Contractor. Size nameplates or legends relative to the device. Make from engraved phenolic compound, and properly secure to device.
5. Starters and other disconnects furnished by the other contractors, shall be installed by the Electrical Contractor. Installation shall include all power field wiring between equipment and starters. The Contractor furnishing the equipment shall be fully responsible for providing adequate and correct wiring diagrams and instructions to the Electrical Contractor.

END 16440

1. GENERAL

1.01 WORK INCLUDED

A. Base Bid: Contractor provide general grounding and bonding of electrical equipment as specified herein and as shown on plans.

1.02 REFERENCES: The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

A. National Fire Protection Association (NFPA): 70-2014 - National Electrical Code (NEC)

B. Underwriters Laboratories, Inc. (UL):

1. 83-83 - Thermoplastic-Insulated Wires and Cables
2. 44-83 - Rubber-Insulated Wires and Cables
3. 467-84 - Grounding and Bonding Equipment

1.04 SUBMITTALS

A. Shop Drawings: Showing the location of system grounding electrode connections and the routing of grounding electrode conductor.

2. PRODUCTS

2.01 GROUNDING WIRES

A. General Purpose: Listed and NEC approved types, copper, with TW, THW, XHHW or dual rated THHN-THWN insulation color identified green.

B. Isolated Power System: Type XHHW insulation with a dielectric constant of 3.5 or less.

C. Size wire not less than what is shown and not less than required by the NEC.

D. Grounding field conductors to be bare between field grounding rods.

2.02 GROUND RODS:

A. Buried: Copperclad steel, 3/4-inch diameter by 10 feet long.

3. EXECUTION

3.01 INSTALLATION, GENERAL

A. Ground in accordance with the NEC as shown, and as hereinafter specified.

B. System Grounding:

1. Secondary service neutrals ground at the supply side of the secondary disconnecting means and at the related transformers.
2. Separately derived systems (transformers downstream from the service entrance) ground the secondary neutral.
3. Isolation transformers and isolated power systems shall not be system ground.
4. Provide ground wire to additional water pipe ground from panels containing second ground

bus.

C. Equipment Grounding. Metallic structures, enclosures, raceways, junction boxes, outlet boxes, cabinets, machine frames, and other conductive items in close proximity with electrical circuits shall be grounded for personnel safety and to provide a low impedance path for possible ground fault currents.

3.02 PRIMARY EQUIPMENT AND CIRCUITS

A. Switchgear: Provide a bare grounding electrode conductor from the switchgear ground bus to a grounding electrode system, metal underground water pipe or driven ground rods for the grounding electrode.

B. Metallic Conduit: Metallic conduits which terminate without mechanical connection to a housing of electrical equipment by means of locknut and bushings or adapters, provided with grounding bushings. Connect bushings with a bare grounding conductor to the equipment ground bus.

3.03 SECONDARY EQUIPMENT AND CIRCUITS

A. Main Bonding Jumper: Connect the secondary service neutral to the ground bus in the service equipment.

B. Switchgear, Switchboards, and Unit Substations:
1. Connect the various feeder green grounding conductors to the ground bus in the enclosure with suitable pressure connectors.
2. Connect the grounding electrode conductor to the ground bus.
3. Connect the neutral to the ground bus (main bonding jumper).
4. Connect metallic conduits, which terminate without mechanical connection to the housing, by grounding bushings and ground wire to the ground bus.
5. Provide water pipe, grounding field, and structural ground as required by 2005 NEC.

C. Conduit Systems:
1. Ground all metallic conduit systems.
2. Non-metallic conduit systems shall contain a grounding conductor.
3. Conduit provided for mechanical protection containing only a grounding conductor, bond to that conductor at the entrance and exit from the conduit.

D. All power and lighting circuits to have a green grounding conductor.

E. Boxes, Cabinets, Enclosures, and Panelboards:
1. Bond the grounding wires to each pullbox, junction box, outlet box, cabinets, and other enclosures through which the ground wires pass (except for special grounding systems for intensive care units and other critical units shown.
2. Provide lugs in each box and enclosure for ground wire termination.
3. Provide ground bars in panelboards, bolted to the housing, with sufficient lugs for terminating the ground wires.

F. Motors and Starters:
1. Provide lugs in motor terminal box and starter housing for ground wire termination.
2. Make ground wire connections to ground bus in motor control centers.

G. Receptacles are not approved for grounding through their mounting screws. Ground with a ground wire from green ground terminal on the receptacle to the outlet box ground screw.

H. Ground lighting fixtures to the green grounding conductor of the wiring system when the green ground is provided; otherwise, ground the fixtures through the conduit systems. Fixtures connected with

flexible conduit shall have a green ground wire included with the power wires from the fixture through the flexible conduit to the first outlet box.

I. Fixed electrical appliances and equipment shall have a ground lug installed for termination of the green ground conductor.

3.04 CONDUCTIVE PIPING: Bond all conductive piping systems in the building to the electrical system ground. Bonding connections shall be made as close as practical to the water pipe ground or service equipment ground bus.

3.05 GROUND RESISTANCE

A. Grounding system ground resistance must not exceed 5 ohms. Final tests shall assure that this requirement is met.

B. Make necessary modifications to the ground electrodes for compliance that are needed without additional cost to the Client, including the provisions of a multi rod system.

3.06 GROUND ROD INSTALLATION

A. Drive each rod vertically in the earth for not less than ten feet in depth.

B. Where permanently concealed ground connections are required, make the connections by the exothermic process to form solid metal joints. Make accessible ground connections with mechanical pressure type ground connectors.

C. Where rock prevents the driving of vertical ground rods, install grounding electrodes in horizontal trenches to achieve the specified resistance.

END 16450

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide:

1. Dry type buck and boost transformers 60Hz; 208V to 240V single phase for Welders (2) and Air Compressors (2).

1.02 REFERENCES

A. ANSI/IEEE 386 - Separable Insulated Connector Systems for Power distribution Systems Above 600V.

B. ANSI/NEMA ST 20 - Dry Type Transformers for General Applications.

C. ANSI ST C57.12.91.

D. NEMA TP1

1.04 SUBMITTALS

A. Submit product data including outline and support point dimensions of enclosures and accessories, unit weight, voltage, KVA, and impedance rating and characteristics, loss data, efficiency at 25, 50, 75, and 100 percent rated load, sound level, tap configurations, insulation system type, and rated temperature rise.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store in a warm, dry location with uniform temperature. Cover ventilating openings to keep out dust.

B. Handle transformers using only lifting eyes and brackets provided for that purpose. Protect units against entrance of rain, sleet, or snow if handled in inclement weather.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS.

A. Eaton

B. General Electric

C. Square D

2.02 DRY TYPE BUCK AND BOOST TRANSFORMERS.

A. Dry Type Buck and Boost Transformer: ANSI/NEMA ST 1; factory-assembled, air cooled, dry type two winding transformer; ratings as shown on the drawings.

B. Insulation system and average winding temperature rise for rated KVA as follows:

KVA Rating	Class	Rise (degree C)
0.25 - 2.0	185	80
3.0 - 7.5	220	115

C. Mounting: Wall.

D. Coil Conductors: Continuous windings.

E. Enclosure: ANSI/NEMA ST 1; Type 1.

F. Isolate core and coil from enclosure using vibration-absorbing mounts.

G. Nameplate: Include transformer connection data.

3. EXECUTION

3.01 INSTALLATION

A. Set transformer plumb and level.

B. Use flexible conduit, 2 ft minimum length, for connections to transformer case. Make conduit connections to side panel of enclosure.

3.02 FIELD QUALITY CONTROL

A. Check for damage and tight connections prior to energizing transformer.

B. Measure primary and secondary voltages and make appropriate tap adjustments.

END 16461

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide:
1. New 800A main switchboard, MDP.
2. Lighting and appliance branch circuit panelboards.

1.02 REFERENCES

A. FS W-C-375 - Circuit Breakers, Molded Case, Branch Circuit and Service.

B. FS W-P-115 - Power Distribution Panel.

C. NEMA AB 1 - Molded Case Circuit Breakers.

D. NEMA PB 1 - Panelboards.

E. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.

F. NEMA PB 2.

1.03 SUBMITTALS

A. Submit shop drawings for equipment and component devices including front view elevation, nameplate schedule, component list, outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker arrangement and sizes of switchboard and new panels.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Square D is the only acceptable manufacturer for panelboards and breakers on this project.
1. I-LINE for main panelboard.
2. NQ for branch circuit panelboards.

2.02 MAIN PANELBOARD

A. Panelboards: NEMA PB 1; circuit breaker type. Listed for non-linear loads by a Nationally Recognized Testing Laboratory.

B. Enclosure: NEMA PB 1; Type 1 (MDP).

C. Provide cabinet front with concealed trim clamps, screw cover, and hinged door with flush lock. Enclosure shall be thoroughly cleaned, phosphate treated and primed by a phosphate or similar treatment, and followed immediately with a rust-inhibiting paint. Final finish coat shall be the ANSI 61 light gray.

D. Provide panelboards with copper bus, ratings as scheduled on Drawings. Provide copper ground bus in all panelboards.

E. Molded Case Circuit Breakers: NEMA AB 1; provide bolt-on type circuit breakers with integral thermal and instantaneous magnetic trip in each pole; See power riser on Sheet E6.01 for ampere interrupting capacity. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch

circuits.

F. Minimum Integrated Short Circuit Rating:

1. 65,000 amperes RMS symmetrical for 208/120 volt main panelboard.

2.03 BRANCH CIRCUIT PANELBOARDS

A. Lighting and appliance branch circuit panelboards: NEMA PB1; circuit breaker type.

B. Enclosure: NEMA PB1; type 1.

C. Provide flush mounted cabinet front with concealed trim clamps, concealed hinge and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.

D. Provide panelboards with copper bus, ratings as shown on drawings.

E. Minimum Integrated Short Circuit Rating:

1. 22,000 amperes RMS symmetrical for 208/120 volt lighting and appliance panelboards.

2.04 CIRCUIT BREAKERS

A. Molded Case Circuit Breakers: NEMA AB 1; plug in type thermal magnetic trip circuit breakers, with common trip handle for all poles. Provide circuit breakers listed as Type SWD for lighting circuits. Provide Class A ground fault interrupter circuit breakers where scheduled on Drawings.

B. Circuit breakers to have minimum integrated short circuit rating matching the panel in which they reside.

C. Circuit breakers in Switchboard MDP shall have 30 cycle short-time withstand ratings equal to their symmetrical interrupting ratings regardless of whether equipped with instantaneous trip protection or not.

D. All circuit breakers shall be constructed and tested in accordance with UL 489 and NEMA AB1-1975 standards. The circuit breaker shall carry a label from an independent testing lab.

E. An indicator shall be located on the faceplate of the breaker to provide a color indication of the breaker position.

F. Do not use tandem circuit breakers.

3. EXECUTION

3.01 INSTALLATION

A. For panels listed on plans as recessed mounted, install panelboard plumb and flush with wall finishes in conformance with NEMA PB 1.1.
B. For panels listed on plans as surface mounted, install panelboard plumb with wall.
C. Height: 5 ft.
D. Provide filler plates for unused spaces in panelboards.

3.02 FIELD QUALITY CONTROL

A. Measure steady state load currents at each panelboard feeder. Should the difference at any panelboard between phases exceed 20 percent, rearrange circuits in the panelboard to balance the

phase loads within 20 percent. Take care to maintain proper phasing for multi-wire branch circuits.

B. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers.

END 16470

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid: Contractor provide:
1. Interior luminaires and accessories, lamps and ballasts.
2. Exterior luminaires and accessories, lamps and ballasts.
3. Poles and accessories for exterior lighting fixtures.

1.02 REFERENCES

A. ANSI C82.1 - Specification for Fluorescent Lamp Ballasts.

B. ANSI C82.4 - Specifications for High-Intensity-Discharge Lamp Ballasts (Multiple Supply Type.)

C. FS W-F-414 - Fixture, Lighting (Fluorescent, Alternating- Current, Pendant Mounting.)

1.03 SUBMITTALS

A. Submit product data and manufacturer's installation instructions including outline drawings, lamp and ballast data, support points, weights, and accessory information for each luminaire type.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Store in a warm, dry location with uniform temperature. Keep in packaging until ready to install.

1.05 WARRANTY: Provide 5 year parts and labor warranty on electronic ballasts, and occupancy sensors.

2. PRODUCTS

2.01 GENERAL

A. Provide lighting fixtures, ballasts, and lamps as indicated on the Drawings or required for the Project. Lighting fixtures shall be of the types indicated on the ELECTRICAL FIXTURE SCHEDULE or as specified herein.

B. Lighting fixtures shall bear a label listed by a nationally recognized testing lab and such labels shall apply to the entire fixture as installed.

2.02 ELECTRONIC BALLASTS

A. Fluorescent lamp ballasts shall be high frequency electronic type, operating lamps at a frequency of 20 kHz or higher with no detectable flicker.

B. Ballast manufacturers shall have been producing electronic ballasts in the U.S. for more than five (5) years with a low failure rate.

C. Ballasts shall be approved and listed by an independent testing lab

D. Ballast shall comply with all applicable state and federal efficiency standards.

E. Ballasts shall comply with FCC and NEMA limits governing electromagnetic and radio frequency interference and shall not interfere with operation of other normal electrical equipment.

F. Ballasts shall create less than 10% total harmonic distortion; third harmonic distortion less than 6%.

G. Ballasts shall not be affected by lamp failure and shall yield normal lamp life.

H. Lamp current crest factor shall not exceed 1.6.

I. Ballasts shall operate at an input frequency of 60 HZ and an input voltage of 108 to 132 (120V models).

J. Ballasts shall have power factor above 0.99.

K. Ballasts that operate as a parallel circuit shall allow remaining lamp(s) to maintain full output if companion lamps(s) fail.

L. Each fluorescent emergency ballast shall be specification grade
1) Capable of an 1100-1400 lumen output for ninety (90) minutes minimum for 4' lamps.

M. All electronic ballasts shall have passive energy saving circuitry to minimize harmonic production.

2.03 INTERIOR FIXTURES AND ACCESSORIES

A. Fluorescent luminaires: FS W-F-414; provide hinged frames with latches and 0.125" thick virgin acrylic lenses or 3" aluminum parabolic louvers.

B. Recessed Fluorescent luminaires: Provide trim type and accessories required for installation in ceiling system installed. Maximum depth of luminaire is 6" including yokes and bridges.

C. Exit signs: Spec. grade fixtures, single and double faced, diffused red LED light source. Provide with universal mounting for wall or ceiling mounting. 2 Knock out arrows on each face. Arrows activated as required by code. Nickel cadmium battery for emergency power.

D. LED High Bay luminaires: Provide trim and accessories required for installation in ceiling system installed.

2.05 EXTERIOR FIXTURES AND ACCESORIES

A. Site Lighting

1. LED, see schedule for size.
2. Low profile architectural design
3. Extruded aluminum housing
4. Gasketed housing
5. Driver designed for -20 degree F starting
6. Dark bronze finish

B. POLES

1. Material and Finish: Steel with dark bronze finish.

2. Section Shape and Dimensions: 4 inch round non-tapering.

3. Height: 20 feet.

4. Base: Nonbreakaway.

5. Accessories:
   a. Handhole.
   b. Anchor bolts.
   c. Base Cover.

6. Approximate Loading Capacity Ratings:
   a. Steady Wind: 100 miles per hour minimum, with gust factor of 1.3.

3. EXECUTION

3.01 INSTALLATION

A. Install lamps in luminaires and lampholders.

B. Install recessed luminaires to permit removal from below. Use plaster frames or grid clips when appropriate.

C. Support surface-mounted luminaires directly.

D. Do not support fixtures from conduit.

3.02 RELAMPING: Relamp luminaires which have been utilized as temporary/construction lighting or have failed lamps at completion of Work.

3.03 ADJUSTING AND CLEANING

A. Align luminaires and clean lenses and diffusers at completion of Work. Clean paint splatters, dirt, and debris from installed luminaires.

B. Touch up luminaire finish at completion of work.

END 16510

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid:

1. Contractor provide:
   a. An addressable fire alarm control panel.
   b. Connections of sprinkler flow switch into alarm gong and fire alarm control panel.
   c. Connection from tamper switch to fire alarm control panel.
   d. Signaling and addressable notification devices which are compatible with the addressable fire alarm control panel.
   e. Two 10 A-hr batteries and charger for new fire alarm control panel.
   f. One addressable remote annunciator panel.
   g. The main fire alarm control panel shall automatically transmit alarm signals to the Mattoon Police Department Central Command (911) station using a digital alarm communicator transmitter in accordance with NFPA 72.

1.02 REFERENCES

A. NFPA 72 - National Fire Alarm Code.

B. NFPA 101 - Life Safety Code.

C. UL 1971 - Standard for Signaling for the Hearing Impaired.

1.03 REGULATORY REQUIREMENTS

A. System: UL listed.

B. Conform to requirements of NFPA 101.

C. Conform to Uniform Building Code.

D. Americans with Disabilities Act.

1.04 SYSTEM DESCRIPTION

A. Fire Alarm System: Provide new addressable fire alarm panel with one remote annunciator panel.

B. Alarm Sequence of Operation: Actuation of manual fire alarm station or automatic initiating device causes system to enter ALARM, which includes the following operations:

1. Sound and display local fire alarm signaling devices with addressable signal.
2. Indicate location of alarm location (address) on fire alarm control panel.
3. Transmit addressable signal to remote station equipment.

C. Alarm Reset: Key-accessible RESET function resets alarm system out of ALARM if alarm initiating circuits have cleared.

D. Trouble Sequence of Operation: System trouble, including grounding or open circuit of supervised circuits, or power or system failure causes system to enter TROUBLE mode, including the following operations:

1. Visual and audible trouble alarm by address at control panel.
2. Manual ACKNOWLEDGE function at control panel silences audible trouble alarm; visual alarm is displayed until initiating trouble is cleared.

3. Transmit trouble signal to remote station.

E. Lamp Test: Manual LAMP TEST function causes alarm indication at fire alarm control panel.

F. Drill Sequence of Operation: Manual DRILL function causes ALARM mode operation to:

1. Sound and display local fire alarm signaling devices.
2. Indicate location of alarm address on fire alarm control panel.

1.05 QUALIFICATIONS

A. Manufacturer: Company specializing in smoke detection and fire alarm systems with ten (10) years documented experience.

B. Installer: Company specializing in smoke detection and fire alarm systems with ten (10) years documented experience.

1.06 SUBMITTALS

A. Submit shop drawings, product data and manufacturer's installation instructions.

B. Provide wiring diagrams, data sheets, and equipment ratings, layout, dimensions, and finishes.

C. Submit manufacturer's certificate that system meets or exceeds specified requirements.

1.07 OPERATION AND MAINTENANCE DATA

A. Submit data including operating instructions, and maintenance and repair procedures.

1.08 WARRANTY

A. All work performed and all material and equipment furnished under this contract shall br free from defects for a period of one year from the date of substantial completion.

2. PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Silent Knight
B. Fire Lite
C. Honeywell Vista

2.02 FIRE ALARM AND SMOKE DETECTION CONTROL PANEL

A. Power Supply: Adequate to serve control panel modules, remote detectors, smoke dampers, relays, and alarm signaling devices. Include battery-operated emergency power supply with capacity for operating system in standby mode for 24 hours followed by alarm mode for 10 minutes.

B. Detection Circuits:
1. Supervised addressable module on existing zones with alarm and trouble indication.
2. Supervised addressable devices with alarm and trouble indication.

C. Signal Circuits: Supervised addressable signal module, sufficient for signal devices connected to system.

2.03 INITIATING DEVICES

A. Manual Station: Addressable, semi-flush mounted, double action manual station with break-glass rod.

B. Ceiling Mounted Smoke Detector: Addressable, UL listed, solid state photo-electric type with and visual indication of detector actuation, suitable for mounting on 4 inch outlet box, 24V dc operation.

C. Initiating devices to be Class B.

2.04 SIGNALING DEVICES

A. Audible/Visible Device: Flush Type fire alarm horn; Sound Rating: 92 dB at 10 feet. Provide integral strobe lamp and flasher with red lettered "FIRE" on clear lens.

B. Notification devices to be Style Y (Class B).

2.05 FIRE ALARM WIRE AND CABLE

A. Fire Alarm Power Branch Circuits: Building wire as specified in Section 16050.

B. Power limited fire-protective signaling cable classified for fire and smoke characteristics, red insulation, copper conductor, 300 volts insulation rated 105° C, suitable for use in air handling units, hollow spaces used as ducts, and plenums.

3. EXECUTION

3.01 INSTALLATION

A. Install system in accordance with manufacturer's instructions.

B. Install manual station with operating handle 44 inches above floor. Install audible/visible and visual only signal devices 88" inches above floor.

C. Automatic Detector Installation: NFPA 72.

3.02 FIELD QUALITY CONTROL: Test in accordance with NFPA 72 and Owner's Safety Officer's requirements.

3.03 MANUFACTURER'S FIELD SERVICES

A. Provide manufacturer's field services.

B. Include services of certified technician to:

1. Advise the workmen in the proper installation.
2. Conduct system testing.
3. Make adjustments required.

3.02 TRAINING

A. General:

1. The Contractor shall provide up to 2 hours of training of owner designated personnel. Such training shall be for the purpose of teaching the following:
   a. System architecture.
   b. Purposes and features of individual system components.
   c. Overview of all control and related programs in the system.
   d. Proper operation, maintenance and troubleshooting of the system.

2. One of the requirements for Substantial Completion on this project is that all training be complete.

B. Training to take place after the system is operational to the extent that realistic instruction can take place using the front end equipment and distributed control units.

C. Coordinate training periods with Using Agency.

D. Contractor shall provide printed materials which illustrate and explain the discussion topics.

END 16721

1. GENERAL

1.01 WORK INCLUDES

A. Contractor shall include in their bid the cost of the Telephone Utility Company to provide:
   1. Telephone service, terminal backboard, wired phone jacks at locations shown on drawings.

1.02 QUALITY ASSURANCE

A. Telephone Utility Company:

   1. Consolidated Communications
      Rick Sowers
      Ph: (217) 258-9688
      E-mail: rick.sowers@consolidated.com

B. Install work in accordance with Telephone Utility Company's rules and regulations.

2. PRODUCTS

2.01 TELEPHONE TERMINATION BACKBOARDS

A. Material: Plywood. Painted.
B. Size: 2 x 2 feet, 3/4 inch thick.

3. EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.
B. Verify that field measurements are as shown on Drawings.
C. Beginning of installation means installer accepts existing conditions.

3.02 INSTALLATION

A. Finish paint termination backboards with durable white enamel prior to installation of telephone equipment.
B. Support raceways and backboards securely to the building structure.
C. Install termination backboards plumb, and attach securely at each corner.
D. Install pull wire in each empty telephone conduit containing a bend or over 10 ft. in length.

END 16741

1. GENERAL

1.01 WORK INCLUDES

A. Base Bid:

1. Contractor shall include in their bid the cost of the Internet Provider to: (Note the electrical sub-contractor shall be required to provide the conduit as shown on sheet E1.04.)
   a. Provide cable, terminations, and face plates for communications system as shown on the drawings and specified herein.
   b. Provide CAT6 jacks, and cabling as part of the data service outlet for wall locations, including terminations.
   c. Provide telephone front end and provide 66 blocks if required on backboards for terminations.
   d. Provide the voice cabling from telephone jacks to the telephone front end.
   e. Provide internet cabling connection.

2. Contractor shall include their bid the following work for the Security Camera Provider:
   a. Provide conduit and boxes for security cameras.
   b. Provide CAT6 cabling from security rack to cameras.

1.02 QUALITY ASSURANCE

A. Internet Provider:

1. Consolidated Communications
   Rick Sowers
   Ph: (217) 258-9688
   E-mail: rick.sowers@consolidated.com

1.03 PROJECT/SITE CONDITIONS:

A Verify all dimensions by field measurements.

B. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.

C. Examine areas and conditions under which all items are to be installed, and notify A/E in writing of conditions detrimental to proper completion of the work. Do not proceed with that portion of the work affected until unsatisfactory conditions have been corrected in an acceptable manner.

1.04 SEQUENCING/COORDINATION:

A. Sequence, coordinate, and integrate installations of communications materials and equipment for efficient flow of the Work.

B. Coordinate communications equipment and materials installation with other building components.

C. Coordinate the cutting and patching of building components to accommodate the installation of communications equipment and materials.

D. Install communications equipment to facilitate maintenance, repair and replacement of equipment components. Connect equipment for ease of disconnecting, minimizing interference with other installations.

E. Coordinate the installation of communications materials and equipment with other Contractors.

1.05 REGULATORY REQUIREMENTS:

A. All communications wiring, devices and Work shall conform to the most recent requirements of the

following codes, standards and organizations where applicable.

1. American National Standards Institute (ANSI)
2. Electronic Industries Association (EIA)
3. Federal Communications Commission (FCC)
4. Institute of Electrical and Electronics Engineers (IEEE)
5. International Standards Organization (ISO)
6. National Electrical Code (NEC)
7. National Fire Protection Association (NFPA)
8. Uniform Building Code (UBC)
9. Underwriters Laboratories (UL)
10. Society of Motion Picture and Television Engineers (SMPTE)
11. National Television Standards Committee (NTSC)
12. Building Officials and Administrators (BOCA)

1.06 EQUIPMENT IDENTIFICATION. Engrave and/or label all removable equipment with name of the school district and/or appropriate identification number as specified.

1.07 SYSTEM DESCRIPTION

A. Provide and test all cabling and equipment necessary for a complete and functioning Local Area Network (LAN) cabling system as specified and indicated on drawings.

B. No cable runs (from Distribution Frame to outlet device) shall exceed 90 meters in length.

C. Provide all faceplates, and patch panels.

D. Provide Cat. 6 cables to each data outlet in rooms as directed on plans. Two, (2) Cat 6 cables with jacks to each wall data outlet from the server room.

E. Provide telephone conductors from the phone board to each phone jack shown on the drawings.

1.08 WARRANTY. Contractor will effect replacement or repair of any defective part of the entire system for a period of one (1) year after substantial completion.

2. PRODUCTS

2.01 GENERAL

A. All products bid shall be the most current and up-to-date versions available, unless otherwise specified.

B. Provide all miscellaneous materials including mounting hardware and accessories which are necessary and reasonably incidental to a complete system.

2.02 MATERIALS

A. Voice Cabling: 24 gauge, 4 pair, “Exchange Filled Cable” from Lucent Technologies 188 Type protectors for EACH cable pair at EACH cable end.

B. Faceplates: (Lucent Technologies “M” Series, Hubbell, Panduit, Amp, or Siemens)

C. Jacks: (Lucent Technologies, Panduit, Hubbell, Amp, or Siemens)

D. Data Cabling. Horizontal Copper Cabling: 4-pair 24 awg twisted-pair cabling meeting ANSI/TIA/EIA-568-B Category 6 requirements (Belden, CommScope, Mohawk, or General).

E. Fiber Optic Cabling: 6 & 12 Stand Single Mode & Multi-mode Fiber Optic Cabling.

F. Cable Management. Provide rack mounted cable horizontal cable management for each 48 terminations. (Lucent, Amp, Panduit, and Siemens are acceptable manufacturers).

G. PLENUM cable and PLENUM cable ties are required for all data and communication cable.

3. EXECUTION

3.01 GENERAL

A. Install all equipment and components in accordance with manufacturer's written instructions. Comply with the NEC, and recognized industry practices, to ensure that all items comply with specifications and serve intended purposes.

B. All Cabling and equipment shall be installed in accordance with good engineering practices as established by the EIA and the NEC. Cabling shall meet all applicable local, State, and Federal building codes

3.02 INSTALLATION

A. Cabling - General:

1. Conduit, Raceways and Outlet Boxes, to be provided as required.
2. Furnish and install Faceplates and Faceplate Jacks in Outlet Boxes for all information outlets specified on drawings.
3. Furnish and install grommets and/or bushing in conduit ends to prevent damage to insulation or conductors.
4. Furnish and install cabling runs between the server room and each information outlet specified on drawings. A dedicated cabling run shall be utilized for each Faceplate Jack.
5. Excess cable behind face plate connections shall be pulled back into ceiling spaces and secured in such a manner as to prevent damage to cabling or connections.
6. Use Cable Tie Tool to install cable ties with appropriate pressure to the cable bundles so not to damage cable and provide a smooth cut of excess cable tie. Cable ties MUST be able to be turned freely around the bundle of cable. Cable bundles shall be limited to 3" diameter. Cable ties to be used for cable bundle “Above the Ceiling”.
7. Use Velcro ® Bands to secure cable bundles from where the cable exits the ceiling and terminates at the Patch Panel on the MDF and/or IDF.
8. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer's published torque tightening values for equipment connectors.
9. Allow sufficient slack in cable to prevent premature deterioration of cable system components and to assist in the maintenance and servicing of cable and/or other building systems and components. Avoid excessive and sharp bends. Ensure manufacturer's recommended pulling tensions are not exceeded.
10. Furnish and install Cable Distribution Rings (D-Rings) as necessary to route and support cables every 4 Feet. Cabling secured to conduits, pipes, etc. will NOT be accepted.
11. Fittings or connections are allowed only at the input and output of devices. Splicing shall not be accepted in any cable run. The entire cable run shall be replaced in all such instances.
12. J- hooks to be installed on uneven intervals. For example, do not install J- hooks every 24". Instead, install the first one and then move 20" and install the second one, then 18" to install the third one, then 24" to install the next one, etc.

B. Grounding. Ground all equipment per manufacturers' instructions, NEC guidelines, EIA\TIA 568, and EIA/TIA 607. In general, this consists of a # 6 Green Stranded Ground Wire from EACH equipment rack to the building structure and SECOND ground wire from each equipment rack to the building electrical distribution ground.

C. Labeling:
1. Use the “ Information Outlet Coding System”
2. Pan Net machine fed labels or prior approved equal self-adhesive typed labels shall be utilized as follows:

a. Place labels on Faceplates adjacent to EACH jack.
b. Label all patch panel terminations at EACH jack location.
c. Label EACH END of all cabling runs with a label at 3" to 5" from the termination

3. Each Cat 6 cable to be individually numbered and this number is to be readily displayed on the voice/data or AV faceplate as well as on the data rack termination end. **DO NOT** use Room numbers and letters for describing the location of the cable.

3.03 ADJUSTING/TESTING

A. Test all cabling and connections with specified equipment and certify as meeting all specifications.

B. Provide hard copy test results for each cabling run including:
1. Near End Crosstalk (NEXT), Attenuation
2. Testing for Shorts/Breaks
3. Correct Pairing
4. Cable Length.

C. Category SIX cabling shall be tested to 250 MHZ.

D. The front page(s) of test report shall include:
1. Information Jack summary
2. Jack Number
3. Cable Length
4. Pass/Fail

E. Riser Cabling shall be “Tone Tested”
F. Printout generated by the test equipment shall be be part of test report.

END 16760