PROJECT MANUAL

for

LTBB ODAWA INDIANS

911 Spring Street Building Remodeling

PROJECT NO. 0175-11

April 2, 2012

ANTHONY P. ESSON
ARCHITECT
PO BOX 479 GAYLORD, MICHIGAN 49734
TELEPHONE: 989/732-0585 FAX: 480/772-4562

DOCUMENT 00 01 01

PROJECT TITLE PAGE

PROJECT NAME: LTBB Odawa Indians
911 Spring Street Building Remodeling

OWNER: Little Traverse Bay Bands of Odawa Indians
7500 Odawa Circle
Harbor Springs, MI 49740
Contact: Bryan Gillett, Planning Director
Telephone: 231/242-1580
Fax: 231/242-1585

ARCHITECT: Anthony Esson, Architect

Mailing Address:
P.O. Box 479
Gaylord, MI 49734

Shipping Address:
2111 Forester Drive
Frederic, MI 49733

Contact: Anthony P. Esson, Architect, LEED AP
PH: 989-732-0585
Fax: 989-732-2102
E-mail: tony@anthonyessonarchitect.com

ENGINEER: JLK Engineering
5766 Catawaba Ct.
Gaylord, MI 49735
Contact: Justin Kowatch, PE, LEED AP
PH: 989-448-4631
E-mail: jkowatch@jlkengineering.com

DOCUMENT 00 01 10

TABLE OF CONTENTS

Section Title

PROCUREMENT AND CONTRACTION REQUIREMENTS GROUP
DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

INTRODUCTORY INFORMATION

00 01 01 Project Title Page 1
00 01 10 Table of Contents 3

PROCUREMENT REQUIREMENTS

00 11 16 Invitation to Bid 2
00 21 13 Instructions to Bidders 7
00 41 13 Bid Form - Stipulated Sum 4

CONTRACTING REQUIREMENTS

00 52 14 Agreement Form 1
AIA Document A107 – 2007 23

SPECIFICATIONS GROUP
GENERAL REQUIREMENTS SUBGROUP

DIVISION 01 - GENERAL REQUIREMENTS

01 10 00 Summary 2
01 20 00 Price and Payment Procedures 5
01 30 00 Administrative Requirements 5
01 33 00 Submittal Procedures 5
01 40 00 Quality Requirements 3
01 50 00 Temporary Facilities and Controls 5
01 60 00 Product Requirements 3
01 70 00 Execution and Closeout Requirements 7

FACILITY CONSTRUCTION SUBGROUP

DIVISION 02 - EXISTING CONDITIONS

02 41 19 Selective Structure Demolition 3

DIVISION 04 – MASONRY

04 73 00 Simulated Stone Veneer 5

DIVISION 06 – WOOD AND PLASTIC

06 10 00 Rough Carpentry 4
06 20 00 Finish Carpentry 5
06 41 00 Architectural Wood Casework 7

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

07 46 33 Plastic Siding 3
07 90 00 Joint Protection 4

DIVISION 08 – OPENINGS

08 12 14 Standard Steel Frames 4
08 14 16 Wood Doors 5
08 17 43 FRP Doors and Aluminum Framing System 5
08 34 61 Bullet Resistant Wood Door and Frame Assembly 4
08 52 00 Wood Windows 5
08 56 13 Bullet Resistant Transaction Windows 4
08 71 00 Door Hardware 22
08 80 00 Glazing 7

DIVISION 09 - FINISHES

09 21 16 Gypsum Board Assemblies 4
09 30 00 Tiling 5
09 51 13 Acoustical Panel Ceilings 4
09 68 16 Carpeting 5
09 90 00 Painting and Coating 7

DIVISION 10 – SPECIALTIES

10 14 00 Signage 3
10 28 00 Toilet, Bath and Laundry Accessories 4
10 73 13 Awnings 4

DIVISION 13 – SPECIAL CONSTRUCTION

13 40 00 Bullet Resistant Fiberglass Composite 3

FACILITY SERVICES SUBGROUP

DIVISION 22 - PLUMBING

22 00 01 General Plumbing Requirements 11
22 07 19 Plumbing Piping Insulation 5
22 07 21 Piping Safety Covers 2
22 10 05 Plumbing Piping 10
22 10 06 Plumbing Piping Specialties 4

22 40 00 Plumbing Fixtures 5

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

23 00 01 General Mechanical Requirements 11
23 07 13 Duct Insulation 4
23 07 19 HVAC Piping Insulation 4
23 31 00 HVAC Ducts and Casings 5
23 33 00 Air Duct Accessories 2
23 37 00 Air Outlets and Inlets 2
23 81 28 Small Ductless Split System Heating and Cooling 3

DIVISION 26 - ELECTRICAL

26 00 01 General Electrical Requirements 12
26 05 19 Low-Voltage Electrical Power Conductors and Cables (600 V And Less) 4
26 05 26 Grounding and Bonding for Electrical Systems 3
26 05 29 Hangers and Supports for Electrical Systems 2
26 05 34 Conduit 6
26 05 37 Boxes 4
26 05 53 Identification for Electrical Systems 2
26 09 23 Lighting Control Devices 7
26 24 16 Panelboards 6
26 27 17 Equipment Wiring 2
26 27 26 Wiring Devices 6
26 28 13 Fuses 2
26 28 18 Enclosed Switches 2
26 32 13 Packaged Engine Generator Set 12
26 36 00 Automatic Transfer Switches 9
26 51 00 Interior Lighting 4
26 56 00 Exterior Lighting 4

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

28 31 00 Fire Detection and Alarm 7

SITE AND INFRASTRUCTURE SUBGROUP

DIVISION 32 – EXTERIOR IMPROVEMENTS

32 13 13 Concrete Paving 5

END OF SECTION

DOCUMENT 00 11 16

INVITATION TO BID

Project: 911 Spring Street Building Remodeling

Owner:

Little Traverse Bay Bands of Odawa Indians
7500 Odawa Circle
Harbor Springs, MI 49740

Architect/Engineer:

Anthony P. Esson, Architect
PO Box 479
Gaylord, MI 49734

Date: April 2, 2012

LTBB Odawa Indians will receive Bids from qualified Bidders for remodeling of a building located at 911 Spring Street, Petoskey, Michigan, for the following project:

Description: The project is comprised of the remodeling of approximately 7,150 square feet of existing space for business and office use.

Sealed Bids may be mailed or delivered in person to LTBB Odawa Indians, c/o Bryan Gillett; Planning Director; 7500 Odawa Circle, Harbor Springs, MI 49740. Bids must be received prior to 2:00 PM local time on the 3rd day of May, 2012. Bids will be opened publically and read aloud in the Governmental Center Commons immediately following the closure of the bidding period. The Owner will not consider or accept a bid received after the date and time specified for bid submission. Post Bid Interviews with the apparent low Bidder(s) will be scheduled following receipt of Bids. All Bids will be evaluated at a later date.

There will be a Mandatory Pre-Bid Meeting conducted by the Owner and Architect/Engineer at 2:00 PM local time on the 24th day of April, 2012. The meeting will convene at the 911 Spring Street building. The Pre-Bid Meeting will consist of a brief informational meeting followed by an opportunity for Bidders to examine the Project site. Attendance by Bidders is mandatory. Attendance by Sub-bidders is not mandatory, but is strongly encouraged.

The Owner will award the contract to a single Contractor for work of all trades on or about May 16, 2012.

Bidding Documents will be available on or about April 5, 2012, and will be on file for inspection at the following locations:

LTBB Odawa Indians Planning Department
Builders Exchange Traverse City, Grand Rapids, Lansing, and Saginaw
CDC News Michigan
Construction Association of Michigan
Construction News Corporation
Reed Construction Data
McGraw Hill, F.W. Dodge

Bidding Documents will be available to Bidders in electronic format (.pdf) free of charge. Interested Bidders may download the Bid Documents from the Tribe's website at www.ltbbodawa-nsn.gov. Paper copies of Bidding Documents may be purchased from Traverse Reproduction & Supply Company; 1373 Barlow Street, Traverse City, MI 49686; telephone 231/947-6284, fax: 231/947-6552. Requests for paper copies of Bidding Documents shall be made to Traverse Reproduction & Supply Company at the address above. Each request should be accompanied by the Bidders name, mailing address, shipping address if different, telephone and fax numbers, and e-mail address. Contact Traverse Reproduction & Supply Company for non-refundable Bidding Document purchase pricing and shipping costs.

A Bid security in the amount of 5 percent of the Bid Sum in the form of a Bid Bond, or certified check payable to the Owner shall accompany each Bid. A personal or company check does not constitute a Bid security.

Refer to other bidding requirements described in Document 00 21 13.

Bids shall be submitted on the Bid Form provided in the Bidding Documents.

The successful Bidder will be required to furnish Performance and Labor/Material Payment Bonds in the amount of 100% of the contract amount.

Bids will be required to be submitted under a condition of irrevocability for a period of 60 days after submission.

The Owner reserves the right to accept or reject any or all Bids, either in whole or in part; to award the Contract to other than the lowest Bidder; to waive any irregularities and/or informalities; and in general to make awards in any manner deemed to be in the best interest of the Owner.

END OF DOCUMENT

DOCUMENT 00 21 13

INSTRUCTIONS TO BIDDERS

1.1 SUMMARY

A. Document Includes:
1. Bid submission.
2. Intent.
3. Work identified in contract documents.
4. Contract Time.
5. Definitions.
6. Contract Documents identification.
7. Availability of documents.
8. Examination of documents.
9. Inquiries and Addenda.
10. Product substitutions.
11. Site examination.
12. Prebid conference.
13. Bidder qualifications.
14. Subcontractors.
15. Submission procedure.
16. Bid ineligibility.
17. Security deposit.
18. Performance Assurance.
19. Bid Form requirements.
20. Fees for changes in the Work.
21. Bid Form signature.
22. Additional bid information.
23. Selection and award of alternates.
24. Bid opening.
25. Duration of offer.
26. Acceptance of offer.

B. Related Documents:
1. Document 00 11 16 - Invitation to Bid.
2. Document 00 41 13 - Bid Form - Stipulated Price (Single-Prime Contract).
3. AIA Document A107-2007 Standard Form of Agreement Between Owner and Contractor for a Project of Limited Scope.
   a. Definitions.
   b. Contract Time identification.
   c. Tax exempt procedures.
   d. Contractors fees for changes.
   e. Contractor's liability insurance.
   f. Bond types and values.
   g. Liquidated Damages

1.2 BID SUBMISSION

A. Bids signed and under seal, executed, and dated will be received by the LTBB Odawa Indians c/o Bryan Gillett, Planning Director; 7500 Odawa Circle, Harbor Springs, MI 49740 until 2:00 PM local time on the 3rd day of May, 2012.

B. Bids submitted after the above time will not be considered.

C. Amendments to submitted Bids will be permitted when received in writing prior to bid closing and when endorsed by the same party or parties who signed and sealed the Bid.

D. Bidders may withdraw their Bid by written request at any time before bid closing.

1.3 INTENT

A. The intent of this Bid request is to obtain an offer to perform work to complete remodeling of the existing building located at 911 Spring Street, Petoskey, MI 49770 for a Stipulated Price contract, in accordance with Contract Documents.

1.4 WORK IDENTIFIED IN CONTRACT DOCUMENTS

A. Work of this proposed Contract comprises remodeling of an existing building, including mechanical and electrical Work as described in the drawings and specifications.

B. Location: 911 Springs Street, Petoskey, MI 49770..

1.5 CONTRACT TIME

A. Identify Contract Time in the Bid Form. The completion date in the Agreement shall be the Contract Time added to the commencement date.

B. The Owner requires the work of this contract be completed as quickly as possible. Consideration will be given to time of completion when reviewing submitted Bids.

C. Liquidated Damages: Owner and Contractor recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not Substantially Complete and approved for occupancy by applicable Governing Authorities within the time agreed upon, plus any extensions of time as allowed by the General Conditions. They also recognize the delays, expense and difficulties involved in proving in a legal proceeding the actual loss suffered by the Owner if the Work is not Substantially Complete on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as penalty) Contractor shall pay the Owner Five Hundred Dollars ($ 250.00) for each day that expires after the date of Substantial Completion agreed upon until the Work is Substantially Complete. Liquidated Damages charges shall be deducted from the Contractor's progress payment. The Owner reserves the right to demand legal proceedings should the actual loss exceed the damages provided herein.

D. Contractor shall achieve Final Completion not later than thirty days after Substantial Completion. All architectural costs incurred after the Final Completion date resulting from the Contractor's failure to complete the Work as agreed shall be paid by the Contractor to the Owner prior to the authorization of final payment. Charges to the Contractor shall be made at such times and in such amounts as the Architect invoices the Owner under the current rate schedule in effect at the time of service, for services provided in connection with the Work. The architectural costs incurred after the final completion date will be deducted from the Contractor’s progress payment or final payment as applicable.

1.6 DEFINITIONS

A. Bidding Documents: Contract Documents supplemented with Invitation To Bid, Instructions to Bidders, Bid Form, and bid securities, identified.

B. Contract Documents: Defined in AIA Document A201-1997 Article 1, including issued Addenda.

C. Bid: Executed Bid Form and required attachments submitted in accordance with these Instructions to Bidders.

D. Bid Price: Monetary Price identified by the Bidder in the Bid Form.

1.7 CONTRACT DOCUMENTS IDENTIFICATION

A. The Contract Documents are identified as Project Number 0175-11; LTBB Odawa Indians 911 Spring Street Building Remodeling as prepared by Anthony Esson, Architect and identified in the Project Manual.

1.8 AVAILABILITY OF DOCUMENTS

A. Bidding Documents may be obtained as stated in Invitation to Bid.

B. Bidding Documents are made available only for the purpose of obtaining offers for this Project. Their use does not grant a license for other purposes.

1.9 EXAMINATION OF DOCUMENTS

A. Bidders are responsible for full examination of the drawings, specifications and any addenda prior to submission of Bids.

B. Bidding Documents are on display at the offices of the Owner and construction association plan room facilities as indicated in the Invitation to Bid.

C. Upon receipt of Bidding Documents verify documents are complete. Notify Architect/Engineer if documents are incomplete.

D. Immediately notify Architect/Engineer upon finding discrepancies or omissions in Bidding Documents.

E. The Architect has endeavored to prepare Bidding Documents without conflicts or inconsistencies, however, it shall be recognized by the Bidder that conflicts and inconsistencies in the Plans and Specifications do occur. As such, in the case of a conflict or inconsistency in the Plans or Specifications that affects the Bid price, the Bidder shall include and/or shall be deemed to have included the higher quantity or quality of Product or material, and/or more labor intensive or costly installation in the Bid.

F. The Architect has endeavored to coordinate the various aspects of the project in preparation of the Bidding Documents, however, it shall be recognized by the Bidder that components of the Work of any one trade may be identified at various locations throughout the Bidding Documents. As such, the successful Bidder shall be responsible for the Work identified in the Contract Documents as a whole without regard to the specific location of the information within the Contract Documents.

1.10 INQUIRIES AND ADDENDA

A. Direct questions in writing to Anthony P. Esson, at the office of the Architect/Engineer; e-mail at tony@anthonyessonarchitect.com.

B. Verbal answers are not binding on any party.

C. Submit questions not less than 7 days before date set for receipt of Bids. Replies will be made by Addenda.

D. Addenda may be issued during bidding period. Addenda will be posted on Tribe's website and sent to construction association plan room facilities. Addenda become part of the Contract Documents. Include resultant costs in the Bid Price.

1.11 PRODUCT SUBSTITUTIONS

A. Where Bidding Documents allow "or equal" Products, substitutions may be made at the Bidder's discretion. Products substituted shall provide equal function, performance, dimension, appearance and quality as provided by the specified product. The Architect reserves the right to reject substitutions not meeting criteria for equal function, performance, dimension, appearance and quality. In that event, Contractor will be required to provide products meeting equal function, performance, dimension, appearance and quality criteria at no additional cost to the Owner. Preapproval for products specified as "or equal" prior to the submission of Bids is not required, and will not be acknowledged by the Architect.

B. Where the Bidding Documents stipulate particular Products with no provisions for substitutions, substitutions will not be considered. The Architect will not acknowledge or respond to requests for substitutions for products specified "no substitutions" or "substitutions not permitted".

C. Where Bidding Documents stipulate particular Products with provisions for substitutions, substitution requests will be considered by Architect/Engineer up to 7 days before receipt of Bids.

D. With each substitution request, provide sufficient information for Architect/Engineer to determine acceptability of proposed products.

E. When a request to substitute a Product is made, Architect/Engineer may approve the substitution. Approved substitutions will be identified by Addenda.

F. In submission of substitutions to Products specified, Bidders shall include in their Bid, changes required in the Work and changes to Contract Time and Contract Price to accommodate such approved substitutions. Later claims by the Bidder for an addition to the Contract Time or Contract Price because of changes in Work necessitated by use of substitutions will not be considered.

1.12 SITE EXAMINATION

A. Examine Project site before submitting a Bid.

1.13 PREBID CONFERENCE

A. A Bidders conference is scheduled for 2:00 PM on the 24th day of April, 2012 at the project site 911 Spring Street, Petoskey, MI 49770.

B. General contract Bidders are required to attend. Attendance by major trades sub-bidders is not required, but is strongly encouraged.

C. Representatives of the Owner and Architect/Engineer will be in attendance.

D. Information relevant to Bidding Documents will be issued by Addendum.

1.14 BIDDER QUALIFICATIONS

A. To demonstrate qualification for performing the Work of this Contract, Bidders may be requested to submit written evidence of financial position, previous experience, current commitments, and license to perform work.

1.15 SUBCONTRACTORS

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

B. Refer to AIA Document A201-1997, Article 5 of General Conditions.

1.16 SUBMISSION PROCEDURE

A. Bidders shall be solely responsible for delivery of Bids in manner and time prescribed.

B. Submit two copies of executed offer on Bid Forms provided, signed and sealed with required security deposit in a closed opaque envelope, clearly identified with Bidder's name, Project name, and Owner's name on the outside.

C. An abstract summary of submitted Bids will be made available to all Bidders following bid opening.

1.17 BID INELIGIBILITY

A. Bids that are unsigned, improperly signed or sealed, conditional, illegible, obscure, contain arithmetical errors, erasures, alterations, or irregularities of any kind, will be declared unacceptable at Owner's discretion.

B. Bid Forms, and enclosures which are improperly prepared will be declared unacceptable at Owner's discretion.

C. Failure to provide security deposit, bonds or insurance requirements will invalidate the Bid at the discretion of the Owner.

1.18 SECURITY DEPOSIT

A. Bids shall be accompanied by security deposit as follows:
   1. Bid Bond of a sum no less than 5 percent of the Bid Price on standard surety company form.
   2. Certified check in the amount of 5 percent of the Bid Price

B. Endorse Bid Bond in name of the Owner as obligee, signed and sealed by the principal (Contractor) and surety.

C. Endorse certified check in name of the Owner.

D. Security deposits will be returned after execution of the Owner Contractor agreement.

E. If no contract is awarded, security deposits will be returned.

1.19 PERFORMANCE ASSURANCE

A. Accepted Bidder: Provide a Performance and Payment bond as described in AIA Document A107 – 2007.

B. Include the cost of performance assurance bonds in the Bid Price.

1.20 BID FORM REQUIREMENTS

A. Complete requested information in the Bid Form and Bid Form Supplements.

1.21 FEES FOR CHANGES IN THE WORK

A. Include in the Bid Form, the overhead and profit fees on Bidder's own Work and Work by Subcontractors, applicable for Changes in the Work, whether additions to or deductions from the Work on which the Bid Price is based.

B. Include in the Bid Form, fees proposed for subcontract work for changes (both additions and deductions) in the Work. The Contractor shall apply fees as noted, to Subcontractor's gross (net plus fee) costs on additional work.

1.22 BID FORM SIGNATURE

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

1.23 ADDITIONAL BID INFORMATION

A. Lowest Bidder is required to complete and submit the following within 24 hours of Bid opening.
   1. List of Subcontractors: Include names of all Subcontractors and portions of the Work each Subcontractor will perform.
   2. Appendix E - Cost Breakdown: Includes Bid Price segmented into portions by trade.

1.24 SELECTION AND AWARD OF ALTERNATES

A. Indicate variation of Bid Price for alternates requested on the Bid Form. Indicate "difference" in Bid Price by adding to or deducting from base Bid Price for each Bid Alternate requested.

B. Bids will be evaluated on total of base Bid Price with full consideration of alternates.

1.25 BID OPENING

A. Bids will be opened publicly immediately after time for receipt of Bids in the LTBB Odawa Indians Governmental Center Commons located at 7500 Odawa Circle, Harbor Springs, MI 49740. Bidders may be present.

1.26 DURATION OF OFFER

A. Bids shall remain open to acceptance and shall be irrevocable for a period of 60 days after bid closing date.

1.27 ACCEPTANCE OF OFFER

A. The Owner reserves the right to accept or reject any or all offers.

B. After acceptance by the Owner, the Architect/Engineer on behalf of the Owner, will issue to the accepted Bidder, a written letter of Contract Award.

C. Notwithstanding delay in the preparation and execution of the Agreement, accepted Bidder shall be prepared, upon written Notice to Proceed, to commence work within seven days following receipt of official written order of the Owner to proceed, or on date stipulated in such order.

D. The accepted bidder shall assist and cooperate with the Owner to prepare the Agreement, and within 7 days following its presentation shall execute Agreement and return it to the Owner.

END OF DOCUMENT

DOCUMENT 00 41 13

BID FORM - STIPULATED PRICE (SINGLE-PRIME CONTRACT)

To: LTBB Odawa Indians
c/o Bryan Gillett, Planning Director
7500 Odawa Circle
Harbor Springs, MI 49740

Project: 911 Spring Street Building Remodeling
AEA Project No. 0175-11

Date: _____

Submitted by: _____
(full name)

(full address) _____

_____

1.1 OFFER

Having examined the Place of The Work and all matters referred to in the Instructions to Bidders and the Contract Documents prepared by Anthony Esson, Architect dated April 2, 2012 for the above mentioned project, we, the undersigned, hereby offer to enter into a Contract to perform the Work for the Price of:

$ _____ (numerical)

$ _____ dollars (written), in lawful money of the United States of America.

We have included the cost of Performance and Labor/Material Payment Bonds in the Bid.

We have included, the security deposit as required by the Instruction to Bidders.

All Cash Allowances described in Section 01 20 00 - Price and Payment Procedures are included in the Bid Price.

We acknowledge that Liquidated Damages will be assessed upon our failure to achieve Substantial Completion prior to the date agreed upon in the Contract, plus any extensions provided by Change Order.

1.2 REQUIRED BID ALTERNATES

We offer the following alternate prices for specific portions of the Work as provided in the Bidding Documents:

Bid Alternate A1 - Delete Acoustical Improvements in 124, 125 and 126: DEDUCT $ _____

Bid Alternate A2 - Delete replacement of designated first floor doors: DEDUCT $ _____

Bid Alternate A3 - Delete replacement of designated second floor doors: DEDUCT $ _____

Bid Alternate A4 - Delete replacement of designated exterior doors: DEDUCT $ _____

Bid Alternate A5 - Delete replacement of hardware from designated doors: DEDUCT $ _____

Bid Alternate A6 – Delete Access Controls from designated doors: DEDUCT $ _____

Bid Alternate M1 - Delete new ductless split heat pump system CU-A/FC-A1/FC-A2 from the Scope of Work: DEDUCT $ _____

Bid Alternate E1 - Delete new fire alarm system: DEDUCT $ _____

Bid Alternate E2 - Delete new Generator and Automatic Transfer Switch: DEDUCT $ _____

1.3 ACCEPTANCE

This offer shall be open to acceptance and is irrevocable for sixty days from the bid closing date.

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

- Execute the Agreement within seven days of receipt of Notice of Award.

- Furnish the required bonds within seven days of receipt of Notice of Award.

- Commence work within seven days after execution of the agreement.

If this bid is accepted within the time stated, and we fail to commence the Work or we fail to provide the required bonds, the security deposit shall be forfeited as damages to the Owner by reason of our failure, limited in amount to the lesser of the face value of the security deposit or the difference between this bid and the bid upon which a Contract is signed.

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

1.4 CONTRACT TIME

If this Bid is accepted, we will:

- Complete the Work in _____ (_____) calendar days from the date of commencement identified I the agreement.

1.5 CHANGES TO THE WORK

When the Architect/Engineer establishes that the method of valuation for Changes in the Work will be net cost plus a percentage fee in accordance with General Conditions, our percentage fee shall be:

_____ percent overhead and profit on the net cost of our own Work;

_____ percent on the gross cost of work done by any Subcontractor.

1.6 ADDENDA

The following Addenda have been received. The modifications to the Bid Documents noted below have been considered and all costs are included in the Bid [Sum.] [Price.]

Addendum # _____ Dated _____

Addendum # _____ Dated _____

Addendum # _____ Dated _____

1.7 APPENDICES

In accordance with Instruction to Bidders, the following documents will be submitted within 24 hours of bid opening and made a condition of the Bid:

- Bidder's qualifications statement and supporting data (if requested by the Owner).

- List of Subcontractors.

- Cost Breakdown.

1.8 BID FORM SIGNATURES

The Corporate Seal of

.....
(Bidder - print the full name of your firm)

was hereunto affixed in the presence of:

.....
(Authorized signing officer Title)

(Seal)

.....
(Authorized signing officer Title)

(Seal)

If the Bid is a joint venture or partnership, add additional forms of execution for each member of the joint venture in the appropriate form or forms as above.

END OF DOCUMENT

DOCUMENT 00 52 14

AGREEMENT FORM - AIA STIPULATED SUM (SINGLE-PRIME CONTRACT)

1.1 SUMMARY

A. Document Includes:
   1. Agreement.

1.2 AGREEMENT

A. AIA Document A107-2007, Standard Form of Agreement Between Owner and Contractor for a Project of Limited Scope as modified, forms the basis of Agreement Between the Owner and Contractor.

END OF DOCUMENT

AIA® Document A107™ – 2007

Standard Form of Agreement Between Owner and Contractor for a Project of Limited Scope

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

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

LTBB Odawa Indians
7500 Odawa Circle
Harbor Springs, Michigan 49740
Telephone Number: (231)242-1421
Fax Number: (231)242-1430

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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

for the following Project:
(Name, location and detailed description)

911 Spring Street Building Remodeling
911 Spring Street
Petoskey, Michigan 49770

The Architect:
(Name, legal status, address and other information)

Anthony Esson, Architect
PO Box 479
Gaylord, MI 49734
Telephone Number: 989/732-0585
Fax Number: 480/772-4562

The Owner and Contractor agree as follows.

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

TABLE OF ARTICLES

1 THE WORK OF THIS CONTRACT

2 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

3 CONTRACT SUM

4 PAYMENT

5 DISPUTE RESOLUTION

6 ENUMERATION OF CONTRACT DOCUMENTS

7 GENERAL PROVISIONS

8 OWNER

9 CONTRACTOR

10 ARCHITECT

11 SUBCONTRACTORS

12 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

13 CHANGES IN THE WORK

14 TIME

15 PAYMENTS AND COMPLETION

16 PROTECTION OF PERSONS AND PROPERTY

17 INSURANCE & BONDS

18 CORRECTION OF WORK

19 MISCELLANEOUS PROVISIONS

20 TERMINATION OF THE CONTRACT

21 CLAIMS AND DISPUTES

ARTICLE 1 THE WORK OF THIS CONTRACT

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

ARTICLE 2 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 2.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.
(Insert the date of commencement, if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

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

§ 2.3 The Contractor shall achieve Substantial Completion of the entire Work not later than ( ) days from the date of commencement, or as follows:
(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

Portion of Work	Substantial Completion Date

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

ARTICLE 3 CONTRACT SUM

§ 3.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be one of the following:
(Check the appropriate box.)

[X] Stipulated Sum, in accordance with Section 3.2 below

~~[ ] Cost of the Work plus the Contractor's Fee, in accordance with Section 3.3 below~~

~~[ ] Cost of the Work plus the Contractor's Fee with a Guaranteed Maximum Price, in accordance with Section 3.4 below~~

(Based on the selection above, complete Section 3.2, 3.3 or 3.4 below.)

§ 3.2 The Stipulated Sum shall be ($), subject to additions and deductions as provided in the Contract Documents.

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

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

Item	Units and Limitations	Price Per Unit ~~($0.00)~~($ 0.00)
None		

§ 3.2.3 Allowances included in the stipulated sum, if any:
(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Allowance
Carpeting Material	$ 30.00 per square yard.

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

~~**§ 3.3 COST OF THE WORK PLUS CONTRACTOR'S FEE**~~
~~**§ 3.3.1** The Cost of the Work is as defined in Exhibit A, Determination of the Cost of the Work.~~

~~**§ 3.3.2** The Contractor's Fee:~~
~~*(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee and the method of adjustment to the Fee for changes in the Work.)*~~

~~**§ 3.4 COST OF THE WORK PLUS CONTRACTOR'S FEE WITH A GUARANTEED MAXIMUM PRICE**~~
~~**§ 3.4.1** The Cost of the Work is as defined in Exhibit A, Determination of the Cost of the Work.~~

~~**§ 3.4.2** The Contractor's Fee:~~
~~*(State a lump sum, percentage of Cost of the Work or other provision for determining the Contractor's Fee and the method of adjustment to the Fee for changes in the Work.)*~~

~~**§ 3.4.3 GUARANTEED MAXIMUM PRICE**~~
~~**§ 3.4.3.1** The sum of the Cost of the Work and the Contractor's Fee is guaranteed by the Contractor not to exceed ($), subject to additions and deductions by changes in the Work as provided in the Contract Documents. Such maximum sum is referred to in the Contract Documents as the Guaranteed Maximum Price. Costs which would cause the Guaranteed Maximum Price to be exceeded shall be paid by the Contractor without reimbursement by the Owner.~~

~~*(Insert specific provisions if the Contractor is to participate in any savings.)*~~

~~**§ 3.4.3.2** The Guaranteed Maximum Price is based on the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:~~

~~**§ 3.4.3.3** Unit Prices, if any:~~
~~*(Identify and state the unit price, and state the quantity limitations, if any, to which the unit price will be applicable.)*~~

~~**Item**~~	~~**Units and Limitations**~~	~~**Price Per Unit ($0.00)**~~

~~**§ 3.4.3.4** Allowances included in the Guaranteed Maximum Price, if any:~~
~~*(Identify and state the amounts of any allowances, and state whether they include labor, materials, or both.)*~~

~~**Item**~~	~~**Allowance**~~

~~**§ 3.4.3.5** Assumptions, if any, on which the Guaranteed Maximum Price is based:~~

ARTICLE 4 PAYMENTS

§ 4.1 PROGRESS PAYMENTS

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

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

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

§ 4.1.3 Provided that an Application for Payment is received by the Architect not later than the last day of a month, the Owner shall make payment of the certified amount to the Contractor not later than the last day of the following month. If an Application for Payment is received by the Architect after the date fixed above, payment shall be made by the Owner not later than thirty (30) days after the Architect ~~receives~~ certifies the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 4.1.4 Retainage, if any, shall be withheld as follows:

The Owner will withhold retainage in the amount of 10% of the completed work through final payment.

§ 4.1.5 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.)

~~%~~ Zero Percent 0%

§ 4.2 FINAL PAYMENT
§ 4.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 18.2, and to satisfy other requirements, if any, which extend beyond final payment;

.2 the contractor has submitted a final accounting for the Cost of the Work, where payment is on the basis of the Cost of the Work with or without a guaranteed maximum price; and

.3 a final Certificate for Payment has been issued by the Architect.

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

ARTICLE 5 DISPUTE RESOLUTION
§ 5.1 BINDING DISPUTE RESOLUTION
For any claim subject to, but not resolved by, mediation pursuant to Section 21.3, the method of binding dispute resolution shall be as follows:
(Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, claims will be resolved in a court of competent jurisdiction.)

~~[ ] Arbitration pursuant to Section 21.4 of this Agreement~~
[X] Litigation in a court of competent jurisdiction

~~[ ] Other *(Specify)*~~

ARTICLE 6 ENUMERATION OF CONTRACT DOCUMENTS
§ 6.1 The Contract Documents are defined in Article 7 and, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 6.1.1 The Agreement is this executed AIA Document A107–2007, Standard Form of Agreement Between Owner and Contractor for a Project of Limited Scope.

§ 6.1.2 The Supplementary and other Conditions of the Contract:

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

Document	Title	Date	Pages
None			

§ **6.1.3** The Specifications:
(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

Section	Title	Date	Pages
01 10 00	Summary	April 2, 2012	2
01 20 00	Price and Payment Procedures	April 2, 2012	5
01 30 00	Administrative Requirements	April 2, 2012	5
01 33 00	Submittal Procedures	April 2, 2012	5
01 40 00	Quality Requirements	April 2, 2012	3
01 50 00	Temporary Facilities and Controls	April 2, 2012	5
01 60 00	Product Requirements	April 2, 2012	3
01 70 00	Execution and Closeout Requirements	April 2, 2012	7
02 41 19	Selective Structure Demolition	April 2, 2012	3
04 73 00	Simulated Stone Veneer	April 2, 2012	5
06 10 00	Rough Carpentry	April 2, 2012	4
06 20 00	Finish Carpentry	April 2, 2012	5
06 41 00	Architectural Wood Casework	April 2, 2012	7
07 46 33	Plastic Siding	April 2, 2012	3
07 90 00	Joint Protection	April 2, 2012	4
08 12 14	Standard Steel Frames	April 2, 2012	4
08 14 16	Wood Doors	April 2, 2012	5
08 17 43	FRP Doors and Aluminum Framing System	April 2, 2012	5
08 34 61	Bullet Resistant Wood Door and Frame Assembly	April 2, 2012	4
08 52 00	Wood Windows	April 2, 2012	5
08 56 13	Bullet Resistant Transaction Windows	April 2, 2012	4
08 71 00	Door Hardware	April 2, 2012	22
08 80 00	Glazing	April 2, 2012	7
09 21 16	Gypsum Board Assemblies	April 2, 2012	4
09 30 00	Tiling	April 2, 2012	5
09 51 13	Acoustical Panel Ceilings	April 2, 2012	4
09 68 16	Carpeting	April 2, 2012	5
09 90 00	Painting and Coating	April 2, 2012	7
10 14 00	Signage	April 2, 2012	3
10 28 00	Toilet, Bath and Laundry Accessories	April 2, 2012	4
10 73 13	Awnings	April 2, 2012	4
13 40 00	Bullet Resistant Fiberglass Composite	April 2, 2012	3
22 00 01	General Plumbing Requirements	April 2, 2012	11

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

22 07 19	Plumbing Piping Insulation	April 2, 2012	5
22 07 21	Piping Safety Covers	April 2, 2012	2
22 10 05	Plumbing Piping	April 2, 2012	10
22 10 06	Plumbing Piping Specialties	April 2, 2012	4
22 40 00	Plumbing Fixtures	April 2, 2012	5
23 00 01	General Mechanical Requirements	April 2, 2012	11
23 07 13	Duct Insulation	April 2, 2012	4
23 07 19	HVAC Piping Insulation	April 2, 2012	4
23 31 00	HVAC Ducts and Casings	April 2, 2012	5
23 33 00	Air Duct Accessories	April 2, 2012	2
23 37 00	Air Outlets and Inlets	April 2, 2012	2
23 81 28	Small Ductless Split System Heating and Cooling	April 2, 2012	3
26 00 01	General Electrical Requirements	April 2, 2012	12
26 05 19	Low-Voltage Electrical Power Conductors and Cables (600 V And Less)	April 2, 2012	4
26 05 26	Grounding and Bonding for Electrical Systems	April 2, 2012	3
26 05 29	Hangers and Supports for Electrical Systems	April 2, 2012	2
26 05 34	Conduit	April 2, 2012	6
26 05 37	Boxes	April 2, 2012	4
26 05 53	Identification for Electrical Systems	April 2, 2012	2
26 09 23	Lighting Control Devices	April 2, 2012	7
26 24 16	Panelboards	April 2, 2012	6
26 27 17	Equipment Wiring	April 2, 2012	2
26 27 26	Wiring Devices	April 2, 2012	6
26 28 13	Fuses	April 2, 2012	2
26 28 18	Enclosed Switches	April 2, 2012	2
26 32 13	Packaged Engine Generator Set	April 2, 2012	12
26 36 00	Automatic Transfer Switches	April 2, 2012	9
26 51 00	Interior Lighting	April 2, 2012	4
26 56 00	Exterior Lighting	April 2, 2012	4
28 31 00	Fire Detection and Alarm	April 2, 2012	7
32 13 13	Concrete Paving	April 2, 2012	5

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

Number	Title	Date
T	Title Sheet / Project Information and Notes	April 2, 2012

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

D1.1	First Floor Demolition Plan	April 2, 2012
D1.2	Second Floor Demolition Plan	April 2, 2012
D1.3	Third Floor Demolition Plan	April 2, 2012
D3.1	First Floor Plan – Ceiling Demolition	April 2, 2012
D3.2	Second Floor Plan – Ceiling Demolition	April 2, 2012
A1.1	First Floor Plan	April 2, 2012
A1.2	Second Floor Plan	April 2, 2012
A1.3	Third Floor Plan	April 2, 2012
A3.1	First Floor Reflected Ceiling Plan	April 2, 2012
A3.2	Second Floor Reflected Ceiling Plan	April 2, 2012
A4.1	Exterior Elevations	April 2, 2012
A5.1	Room Finish Schedule / Interior and Equipment Elevations	April 2, 2012
A5.2	Restroom Floor Plans / Restroom Elevations	April 2, 2012
A5.3	Door Schedule / Door & Frame Elevations and Details	April 2, 2012
M1.1	First Floor Mechanical – Demolition Plan	April 2, 2012
M1.2	Second Floor Mechanical – Demolition Plan	April 2, 2012
M2.1	First Floor Mechanical – New Work Plan	April 2, 2012
M2.2	Second Floor Mechanical – New Work Plan	April 2, 2012
M3.1	Mechanical Details	April 2, 2012
M3.2	Mechanical Details	April 2, 2012
E1.1	First Floor Lighting – Demolition Plan	April 2, 2012
E1.2	Second Floor Lighting – Demolition Plan	April 2, 2012
E2.1	Fist Floor Power – Demolition Plan	April 2, 2012
E2.2	Second Floor Power – Demolition Plan	April 2, 2012
E3.1	First Floor Lighting – New Work Plan	April 2, 2012
E3.2	Second Floor Lighting – New Work Plan	April 2, 2012
E4.1	First Floor Power – New Work Plan	April 2, 2012
E4.2	Second Floor Power – New Work Plan	April 2, 2012
E4.3	Third Floor Power – New Work Plan	April 2, 2012
E5.1	Electrical Details	April 2, 2012
E5.2	Electrical Details	April 2, 2012
E5.3	Electrical Details	April 2, 2012

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

§ 6.1.5 The Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are enumerated in this Article 6.

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

~~**.1** Exhibit A, Determination of the Cost of the Work, if applicable.~~

~~**.2** AIA Document E201™–2007, Digital Data Protocol Exhibit, if completed, or the following:~~

.3 Other documents:
(List here any additional documents that are intended to form part of the Contract Documents.)

Title	Date	Pages
00 11 16 - Invitation to Bid	April 2, 2012	2
00 21 13 - Instructions to Bidders	April 2, 2012	7
00 41 13 - Bid Form – Stipulated Price	May 3, 2012	4

ARTICLE 7 GENERAL PROVISIONS

§ 7.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in Article 6 and consist of this Agreement (including, if applicable, Supplementary and other Conditions of the Contract), Drawings, Specifications, Addenda issued prior to the execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 7.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind between any persons or entities other than the Owner and the Contractor.

§ 7.3 THE WORK

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

§ 7.4 INSTRUMENTS OF SERVICE

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

§ 7.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 7.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

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

§ 7.6 TRANSMISSION OF DATA IN DIGITAL FORM

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

ARTICLE 8 OWNER

§ 8.1 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 8.1.1 The Owner shall furnish all necessary surveys and a legal description of the site.

§ 8.1.2 The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 8.1.3 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 9.6.1, the Owner shall secure and pay for other necessary approvals, easements, assessments and charges required for the construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 8.2 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work which is not in accordance with the requirements of the Contract Documents, or repeatedly fails to carry out the Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order is eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity.

§ 8.3 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents, and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner, without prejudice to any other remedy the Owner may have, may correct such deficiencies and may deduct the reasonable cost thereof, including Owner's expenses and compensation for the Architect's services made necessary thereby, from the payment then or thereafter due the Contractor.

ARTICLE 9 CONTRACTOR

§ 9.1 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 9.1.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 9.1.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 8.1.1, shall take field measurements of any existing conditions related to that portion of the Work and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies, or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

in the Contractor's capacity as a contractor and not as a licensed design professional unless otherwise specifically provided in the Contract Documents.

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

§ 9.2 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 9.2.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures, and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters.

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

§ 9.3 LABOR AND MATERIALS

§ 9.3.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

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

§ 9.3.3 The Contractor may make a substitution only with the consent of the Owner, after evaluation by the Architect and in accordance with a Modification.

§ 9.4 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation or normal wear and tear under normal usage.

§ 9.5 TAXES

The Contractor shall pay sales, consumer, use and other similar taxes that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect. Provided, The Owner represents that this project is exempt from Michigan sales and use taxes under the provisions of the Tax Agreement Between the Little Traverse Bay Bands of Odawa Indians and the State of Michigan. The Contractor will not pay Michigan sales and use taxes on all materials that are purchased, used or acquired in the performance of this Contract that will not be removed from the site. Owner will issue the Contractor tax exemption certificates and provide Contractor any other documents needed to make tax exempt purchases, which Contractor will provide to suppliers.

§ 9.6 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS

§ 9.6.1 ~~Unless otherwise provided in the Contract Documents, the Contractor~~ The Owner shall secure and pay for the building permit as well as other permits, fees, licenses and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

§ 9.6.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work. If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 9.7 ALLOWANCES

The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. The Owner shall select materials and equipment under allowances with reasonable promptness. Allowance amounts shall include the costs to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts. Allowance amounts shall not include the Contractor's costs for unloading and handling at the site, labor, installation, overhead, and profit.

§ 9.8 CONTRACTOR'S CONSTRUCTION SCHEDULES

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

§ 9.8.2 The Contractor shall perform the Work in general accordance with the most recent schedule submitted to the Owner and Architect.

§ 9.9 SUBMITTALS

§ 9.9.1 The Contractor shall review for compliance with the Contract Documents and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in coordination with the Contractor's construction schedule and in such sequence as to allow the Architect reasonable time for review. By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them; (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so; and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents. The Work shall be in accordance with approved submittals.

§ 9.9.2 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents.

§ 9.10 USE OF SITE

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

§ 9.11 CUTTING AND PATCHING

The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly.

§ 9.12 CLEANING UP

The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus material from and about the Project.

§ 9.13 ROYALTIES, PATENTS AND COPYRIGHTS

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

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

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

§ 9.15 INDEMNIFICATION
§ 9.15.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 9.15.1.

§ 9.15.2 In claims against any person or entity indemnified under this Section 9.15 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 9.15.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 10 ARCHITECT
§ 10.1 The Architect will provide administration of the Contract and will be an Owner's representative during construction, until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with other provisions of the Contract.

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

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

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

§ 10.5 The Architect has authority to reject Work that does not conform to the Contract Documents and to require inspection or testing of the Work.

§ 10.6 The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

§ 10.7 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect will make initial decisions on all claims, disputes and other matters in question between the Owner and Contractor but will not be liable for results of any interpretations or decisions rendered in good faith.

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

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

ARTICLE 11 SUBCONTRACTORS

§ 11.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site.

§ 11.2 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of the Subcontractors or suppliers for each of the principal portions of the Work. The Contractor shall not contract with any Subcontractor or supplier to whom the Owner or Architect has made reasonable written objection within ten days after receipt of the Contractor's list of Subcontractors and suppliers. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 11.3 Contracts between the Contractor and Subcontractors shall (1) require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by the Contract Documents, assumes toward the Owner and Architect, and (2) allow the Subcontractor the benefit of all rights, remedies and redress against the Contractor that the Contractor, by these Contract Documents, has against the Owner.

ARTICLE 12 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 12.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under conditions of the contract identical or substantially similar to these, including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such claim as provided in Article 21.

§ 12.2 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's activities with theirs as required by the Contract Documents.

§ 12.3 The Owner shall be reimbursed by the Contractor for costs incurred by the Owner which are payable to a separate contractor because of delays, improperly timed activities or defective construction of the Contractor. The Owner shall be responsible to the Contractor for costs incurred by the Contractor because of delays, improperly timed activities, damage to the Work or defective construction of a separate contractor.

ARTICLE 13 CHANGES IN THE WORK

§ 13.1 By appropriate Modification, changes in the Work may be accomplished after execution of the Contract. The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, with the Contract Sum and Contract Time being adjusted accordingly. Such changes in the Work shall be authorized by written Change Order signed by the Owner, Contractor and Architect, or by written Construction Change Directive signed by the Owner and Architect.

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

§ 13.2 Adjustments in the Contract Sum and Contract Time resulting from a change in the Work shall be determined by mutual agreement of the parties or, in the case of a Construction Change Directive signed only by the Owner and Architect, by the Contractor's cost of labor, material, equipment, and reasonable overhead and profit, unless the parties agree on another method for determining the cost or credit. Pending final determination of the total cost of a Construction Change Directive, the Contractor may request payment for Work completed pursuant to the Construction Change Directive. The Architect will make an interim determination of the amount of payment due for purposes of certifying the Contractor's monthly Application for Payment. When the Owner and Contractor agree on adjustments to the Contract Sum and Contract Time arising from a Construction Change Directive, the Architect will prepare a Change Order.

§ 13.3 The Architect will have authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes shall be effected by written order and shall be binding on the Owner and Contractor. The Contractor shall carry out such written orders promptly.

§ 13.4 If concealed or unknown physical conditions are encountered at the site that differ materially from those indicated in the Contract Documents or from those conditions ordinarily found to exist, the Contract Sum and Contract Time shall be equitably adjusted as mutually agreed between the Owner and Contractor; provided that the Contractor provides notice to the Owner and Architect promptly and before conditions are disturbed.

ARTICLE 14 TIME

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

§ 14.2 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

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

§ 14.4 The date of Substantial Completion is the date certified by the Architect in accordance with Section 15.4.3.

§ 14.5 If the Contractor is delayed at any time in the commencement or progress of the Work by changes ordered in the Work, by labor disputes, fire, unusual delay in deliveries, abnormal adverse weather conditions not reasonably anticipatable, unavoidable casualties or any causes beyond the Contractor's control, or by other causes which the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine, subject to the provisions of Article 21.

ARTICLE 15 PAYMENTS AND COMPLETION

§ 15.1 APPLICATIONS FOR PAYMENT

§ 15.1.1 Where the Contract is based on a Stipulated Sum or the Cost of the Work with a Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values, allocating the entire Contract Sum to the various portions of the Work, 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 in reviewing the Contractor's Applications for Payment.

§ 15.1.2 With each Application for Payment where the Contract Sum is based upon the Cost of the Work, or the Cost of the Work with a Guaranteed Maximum Price, the Contractor shall submit payrolls, petty cash accounts, receipted invoices or invoices with check vouchers attached, and any other evidence required by the Owner to demonstrate that cash disbursements already made by the Contractor on account of the Cost of the Work equal or exceed (1) progress payments already received by the Contractor, less (2) that portion of those payments attributable to the Contractor's Fee; plus (3) payrolls for the period covered by the present Application for Payment.

§ 15.1.3 Payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment stored, and protected from damage, off the site at a location agreed upon in writing.

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

§ 15.1.4 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or other encumbrances adverse to the Owner's interests.

§ 15.2 CERTIFICATES FOR PAYMENT

§ 15.2.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 15.2.3.

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

§ 15.2.3 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 15.2.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 15.2.1. If the Contractor and the Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 9.2.2, because of

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

§ 15.2.4 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 15.3 PROGRESS PAYMENTS

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

§ 15.3.2 Neither the Owner nor Architect shall have an obligation to pay or see to the payment of money to a Subcontractor except as may otherwise be required by law.

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

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

§ 15.4 SUBSTANTIAL COMPLETION

§ 15.4.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

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

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

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

§ 15.5 FINAL COMPLETION AND FINAL PAYMENT

§ 15.5.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions stated in Section 15.5.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 15.5.2 Final payment shall not become due until the Contractor has delivered to the Owner a complete release of all liens arising out of this Contract or receipts in full covering all labor, materials and equipment for which a lien could be filed, or a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including costs and reasonable attorneys' fees.

§ 15.5.3 The making of final payment shall constitute a waiver of claims by the Owner except those arising from

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

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

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

ARTICLE 16 PROTECTION OF PERSONS AND PROPERTY

§ 16.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

.1 employees on the Work and other persons who may be affected thereby;

.2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and

.3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons and property and their protection from damage, injury or loss. The Contractor shall promptly remedy damage and loss to property caused in whole or in part by the Contractor, a Subcontractor, a sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 16.1.2 and 16.1.3, except for damage or loss attributable to acts or omissions of the Owner or Architect or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 9.15.

§ 16.2 HAZARDOUS MATERIALS

§ 16.2.1 The Contractor is responsible for compliance with the requirements of the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents, and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shutdown, delay and start-up.

§ 16.2.2 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area, if in fact, the material or substance presents the risk of bodily injury or death as described in Section 16.2.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

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

ARTICLE 17 INSURANCE AND BONDS

§ 17.1 The Contractor shall purchase from, and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, insurance for protection from claims under workers' compensation acts and other employee benefit acts which are applicable, claims for damages because of bodily injury, including death, and claims for damages, other than to the Work itself, to property which may arise out of or result from the Contractor's operations and completed operations under the Contract, whether such operations be by the Contractor or by a Subcontractor or anyone directly or indirectly employed by any of them. This insurance shall be written for not less than limits of liability specified ~~in the Contract Documents or required by law, whichever coverage is greater,~~ herein, and shall include contractual liability insurance applicable to the Contractor's obligations under Section 9.15. Certificates of Insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work. Each policy shall contain a provision that the policy will not be canceled or allowed to expire until at

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

least 30 days' prior written notice has been given to the Owner. The Contractor shall cause the commercial liability coverage required by the Contract Documents to include: (1) the Owner, the Architect and the Architect's Consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 17.1.1 Contractor's liability insurance shall be no less than the following:

1. General Requirements
   - a. Worker's compensation - statutory
   - b. Employer's liability - established by Owner
2. Comprehensive general liability
   - a. Bodily injury - $1,000,000 each person
     - $1,000,000 each occurrence
   - b. Personal injury - $1,000,000 each person
     - $1,000,000 Aggregate
     - $1,000,000 General Aggregate
3. Automobile liability
   - a. Bodily injury - $1,000,000 each person
     - $1,000,000 each occurrence
   - b. Property damage - $1,000,000 each occurrence
4. Independent contractors - same limits as preceding
5. Products and complete operations - same limits as preceding for one (1) year, commencing with issuance of final Certificate for Payment.
6. Contractual liability - same limits as preceding

§ 17.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 17.3 PROPERTY INSURANCE

§ 17.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance on an "all-risk" or equivalent policy form, including builder's risk, in the amount of the initial Contract Sum, plus the value of subsequent modifications and cost of materials supplied and installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 15.5 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 17.3.1 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and sub-subcontractors in the Project.

§ 17.3.2 The Owner shall file a copy of each policy with the Contractor before an exposure to loss may occur. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 17.3.3 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 12, if any, and any of their subcontractors, sub-subcontractors, agents and employees for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to Section 17.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 12, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

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

§ 17.4 PERFORMANCE BOND AND PAYMENT BOND

§ 17.4.1 The Owner ~~shall have the right to require~~ hereby requires the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder ~~as stipulated in bidding requirements or specifically required in the Contract Documents~~ each in the penal sum of 100% of the Contract Sum and in accordance with applicable law on the date of execution of the Contract.

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

§ 17.4.2 Performance and payment bonds shall be written on AIA Document A312 – 2010.

ARTICLE 18 CORRECTION OF WORK

§ 18.1 The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense, unless compensable under Section A.2.7.3 in Exhibit A, Determination of the Cost of the Work.

§ 18.2 In addition to the Contractor's obligations under Section 9.4, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 15.4.3, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty.

§ 18.3 If the Contractor fails to correct nonconforming Work within a reasonable time, the Owner may correct it in accordance with Section 8.3.

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

§ 18.5 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Article 18.

ARTICLE 19 MISCELLANEOUS PROVISIONS

§ 19.1 ASSIGNMENT OF CONTRACT

Neither party to the Contract shall assign the Contract without written consent of the other, except that the Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

§ 19.2 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located, except, that if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 21.4.

§ 19.3 TESTS AND INSPECTIONS

Tests, inspections and approvals of portions of the Work required by the Contract Documents or by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities shall be made at an appropriate time. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating the costs to the Contractor.

§ 19.4 COMMENCEMENT OF STATUTORY LIMITATION PERIOD

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 19.4.

ARTICLE 20 TERMINATION OF THE CONTRACT

§ 20.1 TERMINATION BY THE CONTRACTOR

If the Architect fails to certify payment as provided in Section 15.2.1 for a period of 30 days through no fault of the Contractor, or if the Owner fails to make payment as provided in Section 4.1.3 for a period of 30 days, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 20.2 TERMINATION BY THE OWNER FOR CAUSE

§ 20.2.1 The Owner may terminate the Contract if the Contractor

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

§ 20.2.2 When any of the above reasons exists, the Owner, upon certification by the Architect that sufficient cause exists to justify such action, may, without prejudice to any other remedy the Owner may have and after giving the Contractor seven days' written notice, terminate the Contract and take possession of the site and of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor and may finish the Work by whatever reasonable method the Owner may deem expedient. Upon request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 20.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 20.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 20.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Architect, upon application, and this obligation for payment shall survive termination of the Contract.

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

§ 20.3 TERMINATION BY THE OWNER FOR CONVENIENCE

The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause. The Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 21 CLAIMS AND DISPUTES

§ 21.1 Claims, disputes and other matters in question arising out of or relating to this Contract, including those alleging an error or omission by the Architect but excluding those arising under Section 16.2, shall be referred initially to the Architect for decision. Such matters, except those waived as provided for in Section 21.8 and Sections 15.5.3 and 15.5.4, shall, after initial decision by the Architect or 30 days after submission of the matter to the Architect, be subject to mediation as a condition precedent to binding dispute resolution.

§ 21.2 If a claim, dispute or other matter in question relates to or is the subject of a mechanic's lien, the party asserting such matter may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

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

§ 21.4 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any claim, subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association, in accordance with the Construction Industry Arbitration Rules in effect on the date of this Agreement. Demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

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

§ 21.6 Any party to an arbitration may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of a Claim not described in the written Consent.

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

§ 21.8 CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor and Owner waive claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- **.1** damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- **.2** damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 20. Nothing contained in this Section 21.8 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ ARTICLE 22 OTHER CONDITIONS OR PROVISIONS

§ 22.1 LIQUIDATED DAMAGES

Owner and Contractor recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not Substantially Complete and approved for occupancy by applicable Governing Authorities within the time agreed upon, plus any extensions of time as allowed by the General Conditions. They also recognize the delays, expense and difficulties involved in proving in a legal proceeding the actual loss suffered by the Owner if the Work is not Substantially Complete on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as penalty) Contractor shall pay the Owner Five Hundred Dollars ($ 250.00) for each day that expires after the date of Substantial Completion agreed upon until the Work is Substantially Complete. Liquidated Damages charges shall be deducted from the Contractor's progress payment. The Owner reserves the right to demand legal proceedings should the actual loss exceed the damages provided herein.

§ 22.2 Contractor shall achieve Final Completion not later than thirty days after Substantial Completion. All architectural costs incurred after the Final Completion date resulting from the Contractor's failure to complete the Work as agreed shall be paid by the Contractor to the Owner prior to the authorization of final payment. Charges to the Contractor shall be made at such times and in such amounts as the Architect invoices the Owner under the current rate schedule in effect at the time of service, for services provided in connection with the Work. The architectural costs incurred after the final completion date will be deducted from the Contractor's progress payment or final payment as applicable.

§ 22.3 The Architect has endeavored to prepare Bidding Documents without conflicts or inconsistencies, however, it shall be recognized by the Bidder that conflicts and inconsistencies in the Plans and Specifications do occur. As such, in the case of a conflict or inconsistency in the Plans or Specifications that affects the Bid price, the Bidder shall include and/or shall be deemed to have included the higher quantity or quality of Product or material, and/or more labor intensive or costly installation in the Bid.

§ 22.4 The Architect has endeavored to coordinate the various aspects of the project in preparation of the Bidding Documents, however, it shall be recognized by the Bidder that components of the Work of any one trade may be identified at various locations throughout the Bidding Documents. As such, the successful Bidder shall be responsible for the Work identified in the Contract Documents as a whole without regard to the specific location of the information within the Contract Documents.

This Agreement entered into as of the day and year first written above.

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
Kenneth J. Harrington, Tribal Chairman	
(Printed name and title)	*(Printed name and title)*

AIA Document A107™ – 2007. Copyright © 1936, 1951, 1958, 1961, 1963, 1966, 1970, 1974, 1978, 1987, 1997 and 2007 by The American Institute of Architects. **All rights reserved. WARNING: This AIA® Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA® Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law.** This document was produced by AIA software at 11:26:14 on 04/04/2012 under Order No.8444368672_1 which expires on 07/07/2012, and is not for resale.
User Notes: (929658677)

SECTION 01 10 00

SUMMARY

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Contract description.

B. Work by Owner.

C. Contractor's use of site and premises.

D. Owner occupancy.

E. Specification Conventions.

1.2 CONTRACT DESCRIPTION

A. Work of the Project includes remodeling of the existing 911 Spring Street Building for the LTBB Odawa Indians as described in the Drawings and Specifications.

B. Perform Work of Contract under stipulated sum contract with Owner in accordance with Conditions of Contract.

1.3 WORK BY OWNER

A. Items noted NIC (Not in Contract), movable cabinets, furnishings, and minor equipment, will be furnished and installed by Owner.

B. Remove and deliver to Owner items specifically noted in the Drawings and specifications prior to start of work.

1.4 CONTRACTOR'S USE OF SITE AND PREMISES

A. Limit use of site and premises to allow:
   1. Owner occupancy.
   2. Work by Others and Work by Owner.

B. Emergency building exits During Construction: Maintain required means of egress from Owner occupied areas at all times during construction operations.

C. Utility Outages and Shutdowns: Required utility outages and shutdowns shall be coordinated with the Owner, and require 72 hours advanced notice. Temporary electrical service to the third floor, and to the IT room on the second floor shall be provided prior to disruption of electrical service for replacement of main service panels, and maintained until permanent service is restored.

1.5 OWNER OCCUPANCY

A. Portions of the third floor of the building will be occupied by the Owner during the duration of the Work for the conduct of normal operations

B. Contractor shall cooperate with Owner to minimize conflict, and to facilitate Owner's operations.

C. Schedule Work to accommodate Owner occupancy, and to avoid disruption of Owner's operations.

1.6 SPECIFICATION CONVENTIONS

A. These specifications are written in imperative mood and streamlined form. This imperative language is directed to the Contractor, unless specifically noted otherwise. The words "shall be" are included by inference where a colon (:) is used within sentences or phrases.

B. The Architect has endeavored to prepare Contract Documents without conflicts or inconsistencies, however it shall be recognized by the Contractor that conflicts and inconsistencies in the Drawings and Specifications may occasionally occur. As such, in case of a conflict or inconsistency in the Drawings or Specifications not brought to the Architects attention prior to Bidding and/or clarified by Addendum, the Contractor shall have deemed to include the higher quantity or quality of material, or more labor intensive or costly installation in the Bid.

C. The Architect has endeavored to coordinate various aspects of the project in the preparation of the Contract Documents, however it shall be recognized by the Contractor that components of the work of any one trade may be identified at various locations throughout the Contract Documents. As such, the Contractor is responsible for the Work identified in the Contract Documents as a whole, irrespective of the specific locations of the information provided.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Cash allowances.

B. Contingency allowances.

C. Schedule of values.

D. Applications for payment.

E. Change procedures.

F. Defect assessment.

G. Alternates.

1.2 CASH ALLOWANCES

A. Costs Included in Cash Allowances: Cost of product to Contractor or Subcontractor, less applicable trade discounts.

B. Costs Not Included in Cash Allowances But Included in Contract Sum/Price: Product delivery to site and handling at site, including unloading, uncrating, and storage; protection of products from elements and from damage; and labor for installation and finishing.

C. Architect/Engineer Responsibilities:
   1. Confirm quantities.
   2. Prepare Change Order.

D. Contractor Responsibilities:
   1. Assist Owner in selection of products.
   2. On notification of selection by Owner, execute purchase agreement with designated supplier.
   3. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
   4. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

E. Differences in costs will be adjusted by Change Order.

F. Allowances Schedule:
   1. Section 04 73 00 – Simulated Stone Veneer: Include the total cost of material based on the unit price of $ 12.00 per square foot for purchase of simulated stone units.
   2. Section 09 68 00 - Carpeting: Include the total cost of material based on the unit price of $ 30.00 per square yard for purchase of carpeting.

1.3 CONTINGENCY ALLOWANCES

A. A Contingency Allowance has been established by the Owner.

B. Funds will be drawn from Contingency Allowance only by Change Order.

1.4 SCHEDULE OF VALUES

A. Submit printed schedule on AIA Form G703 - Continuation Sheet for G702. Contractor's standard form or electronic media printout following format of specified AIA form will be considered.

B. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.

C. Format: Utilize Table of Contents of this Project Manual. Identify each line item with number and title of major specification Section. Identify site mobilization, bonds and insurance, and General Requirements as separate line items.

D. Include in each line item, amount of Allowances specified in this section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by unit cost to achieve total for each item.

E. Include within each line item, direct proportional amount of Contractor's overhead and profit.

F. Revise schedule to list approved Change Orders, with each Application For Payment.

1.5 APPLICATIONS FOR PAYMENT

A. Submit three copies of each application on AIA Form G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet for G702 or approved Contractor's electronic media driven form.

B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

C. Submit updated construction schedule with each Application for Payment.

D. Payment Period: Submit at intervals stipulated in the Agreement.

E. Submit with transmittal letter as specified for Submittals in Section 01 33 00 - Submittal Procedures.

F. Submit a fully executed Sworn Statement indicating all monies owed as of the date of application.

G. Submit evidence of payment in the form of waivers of lien for each subcontractor and supplier included on the sworn statement. Payment will not be released without verification of waivers for the full balance of the previous payment.

H. Substantiating Data: When Architect/Engineer requires substantiating information, submit data justifying dollar amounts in question. Include the following with Application for Payment:
   1. Affidavits attesting to off-site stored products.

1.6 CHANGE PROCEDURES

A. Submittals: Submit name of individual authorized to receive change documents, and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.

B. The Architect/Engineer will advise of minor changes in the Work not involving adjustment to Contract Sum/Price or Contract Time by issuing supplemental instructions in writing to the Contractor.

C. The Architect/Engineer may issue a Proposal Request or Bulletin including a detailed description of proposed change with supplementary or revised Drawings and specifications. Contractor will prepare and submit estimate of cost and any required change in Contract Time within 14 days.

D. Contractor may propose changes by submitting a request for change to Architect/Engineer, describing proposed change and its full effect on the Work. Include a statement describing reason for the change, and effect on Contract Sum/Price and Contract Time with full documentation and a statement describing effect on Work by separate or other Contractors.

E. Stipulated Sum/Price Change Order: Based on Proposal Request (Bulletins) and Contractor's fixed price quotation or Contractor's request for Change Order as approved by Architect/Engineer.

F. Unit Price Change Order: For contract unit prices and quantities, the Change Order will be executed on fixed unit price basis. For unit costs or quantities of units of work which are not pre-determined, execute Work under Construction Change Directive. Changes in Contract Sum/Price or Contract Time will be computed as specified for Time and Material Change Order.

G. Construction Change Directive: Architect/Engineer may issue directive, on AIA Form G713 Construction Change Directive signed by Owner, instructing Contractor to proceed with change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute change.

H. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in Conditions of the Contract. Architect/Engineer will determine change allowable in Contract Sum/Price and Contract Time as provided in Contract Documents.

I. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.

J. Document each quotation for change in cost or time with sufficient data to allow evaluation of quotation.

K. Change Order Forms: AIA G701 Change Order.

L. Execution of Change Orders: Architect/Engineer will issue Change Orders for signatures of parties as provided in Conditions of the Contract.

M. Correlation of Contractor Submittals:
   1. Promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as separate line item and adjust Contract Sum/Price.

2. Promptly revise progress schedules to reflect change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
3. Promptly enter changes in Project Record Documents.

1.7 DEFECT ASSESSMENT

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

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

C. The defective Work may remain, but unit sum/price will be adjusted to new sum/price at discretion of Owner.

D. Defective Work will be partially repaired to instructions of Architect/Engineer, and unit sum/price will be adjusted to new sum/price at discretion of Owner.

E. Individual specification sections may modify these options or may identify specific formula or percentage sum/price reduction.

F. Authority of Architect/Engineer to assess defects is final.

G. Non-Payment For Rejected Products: Payment will not be made for rejected products for any of the following:
1. Products wasted or disposed of in a manner that is not acceptable.
2. Products determined as unacceptable before or after placement.
3. Products not completely unloaded from transporting vehicle.
4. Products placed beyond lines and levels of required Work.
5. Products remaining on hand after completion of the Work.
6. Loading, hauling, and disposing of rejected products.

1.8 ALTERNATES

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

B. Coordinate related work and modify surrounding work.

C. Schedule of Alternates:
1. Deductive Alternate A1:
a. Delete Acoustical Improvements in Prosecutor Office 124, Conference 125, and Prosecutor Office 126 from the Scope of Work. Demolition work deleted under this alternate includes D1 – Removal existing wall base; D2 – Removal of existing gypsum board; D4 – Removal of existing ceiling; and D6 – Removal of existing carpeting. New work deleted under this alternate includes A1 – Installation of acoustical insulation, resilient channels, and gypsum board; Painting of new and existing wall surfaces except as noted below; Installation of new ceiling grid and salvaged ceiling tile; A41 – Installation of acoustical insulation on acoustical ceiling; and installation of new flooring and wall base. Note that demolition and reconstruction work (including patching and painting) in Prosecutor Office 126 associated with reconfiguration of Passage 122 and installation of transaction window is not to be included in this deductive alternate.

2. Deductive Alternate A2:
   a. Delete replacement of existing interior first floor doors, frames and hardware for openings 100.1, 124.1, 125.1, and 126.1 from the Scope of Work. Demolition work deleted under this alternate includes D3 – Remove existing door, frame, hardware and accessories. New work deleted under this alternate includes new door frame, door, glazing, and door hardware.
3. Deductive Alternate A3:
   a. Delete replacement of existing interior second floor doors, frames and hardware for openings 200.2, 202.1, 219.1, 220.1, 221.1, and 224.1 from the Scope of Work. Demolition work deleted under this alternate includes D3 – Remove existing door, frame, hardware and accessories. New work deleted under this alternate includes new door frame, door, glazing, and door hardware.
4. Deductive Alternate A4:
   a. Delete replacement of existing exterior doors, frames and hardware for openings 113.1, 118.2, 122.2, 200.1, and 212.1 from the Scope of Work. Demolition work deleted under this alternate includes D3 – Remove existing door, frame, hardware and accessories. New work deleted under this alternate includes new door frame, door, and glazing. Adjust existing hardware as needed to operate as indicated in Hardware Set 26.
5. Deductive Alternate A5:
   a. Delete replacement of existing door hardware from existing doors 109.1, 110.1, 111.1, 114.1, 115.1, 116.1, 117.1, 118.1, 120.1, 121.1, 123.1, 127.1, 128.1, 129.1, and 130.1.
6. Deductive Alternate A6:
   a. Delete Access Control System from Doors 102.1, 113.1, 122.1, 204.1, 212.1, 214.2 and 215.1. Note that door buzzer, power supply, and electric strike to remain where specified.
7. Deductive Alternate M1:
   a. Delete new ductless split heat pump system CU-A/FC-A1/FC-A2 from the Scope of Work including all associated Mechanical, Plumbing, and Electrical work.
8. Deductive Alternate E1:
   a. Delete new fire alarm system from the Scope of Work.
9. Deductive Alternate E2:
   a. Delete new Generator and Automatic Transfer Switch from the Scope of Work.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 30 00

ADMINISTRATIVE REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Coordination and project conditions.

B. Preconstruction meeting.

C. Progress meetings.

D. Periodic construction visits.

E. Project Record Documents.

F. Acceptance of Preceding Work.

G. Cutting and patching.

H. Special procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

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

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

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

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

E. Coordinate completion and clean-up of Work of separate sections in preparation for Substantial Completion [and for portions of Work designated for Owner's [partial] occupancy].

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

1.3 PRECONSTRUCTION MEETING

A. Architect/Engineer will schedule meeting after Notice of Award.

B. Attendance Required: Owner, Architect/Engineer, and Contractor.

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

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

1.4 PROGRESS MEETINGS

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

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

C. Attendance Required: Job superintendent, major subcontractors and suppliers, Owner, Architect/Engineer, as appropriate to agenda topics for each meeting.

D. Agenda:
1. Review minutes of previous meetings.
2. Review of Work progress.
3. Field observations, problems, and decisions.
4. Identification of problems impeding planned progress.
5. Review of submittals schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule and coordination.
13. Other business relating to Work.
14. Coordination of work by Owner's Contractor with work of the General Contract.
15. Project Record Documents.

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

1.5 PERIODIC CONSTRUCTION VISITS

A. The Architect and Owner will visit the project site periodically during construction. The purpose of the visits will be to monitor the progress and quality of the work.

B. The Contractor's Site Superintendent shall be available for meetings with the Architect and Owner.

C. Agenda:
1. Review of Work in progress.
2. Field observations, problems, and decisions.
3. Identification of problems which impede planned progress.
4. Maintenance of progress schedule.
5. Corrective measures to regain projected schedules.
6. Planned progress during succeeding work period.
7. Maintenance of quality and work standards.
8. Other business relating to Work.

1.6 PRE-INSTALLATION MEETINGS

A. When required in individual specification sections, convene pre-installation meetings at Project site prior to commencing work of specific section.

B. Require attendance of parties directly affecting, or affected by, Work of specific section.

C. Notify Architect/Engineer four days in advance of meeting date.

D. Prepare agenda and preside at meeting:
1. Review conditions of installation, preparation and installation procedures.
2. Review coordination with related work.

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

1.7 PROJECT RECORD DOCUMENTS

A. Contractor shall maintain and update Project Record Drawings (As-Built Drawings) on site during construction. Contractor and each Subcontractor shall be responsible to update the as built drawings on a weekly basis.

B. Project Record Documents shall be available for review by the Architect.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 ACCEPTANCE OF PRECEDING WORK

A. Before starting any operation, each Contractor(s) shall examine work performed by others to which their work adjoins or is applied and shall report to the Architect any conditions that will prevent satisfactory accomplishment of their work.

B. Failure to notify the Architect of deficiencies or faults in preceding work will constitute acceptance thereof and waive of any claims to its usability.

3.2 CUTTING AND PATCHING

A. Employ skilled and experienced installer to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements affecting:
   1. Structural integrity of element.
   2. Integrity of weather-exposed or moisture-resistant elements.
   3. Efficiency, maintenance, or safety of element.
   4. Visual qualities of sight exposed elements.
   5. Work of Owner or separate contractor.

C. Execute cutting, fitting, and patching [including excavation and fill,] to complete Work, and to:
   1. Fit the several parts together, to integrate with other Work.
   2. Uncover Work to install or correct ill-timed Work.
   3. Remove and replace defective and non-conforming Work.
   4. Remove samples of installed Work for testing.
   5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Execute work by methods to avoid damage to other Work, and to provide proper surfaces to receive patching and finishing.

E. Cut masonry and concrete materials using masonry saw or core drill.

F. Restore Work with new products in accordance with requirements of Contract Documents.

G. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

I. Where patching areas of masonry construction subject to wind loading, remove and replace unit. Where patching penetrations in masonry not subject to wind loading, remove face shell and replace with masonry soap matching existing masonry material. Where concealed from view, penetrations in masonry may be patched with mortar. Patching exposed to view masonry penetrations with mortar will not be accepted.

J. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00, to full thickness of penetrated element.

K. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for assembly, refinish entire unit.

L. Identify hazardous substances or conditions exposed during the Work to Architect/Engineer for decision or remedy.

3.3 SPECIAL PROCEDURES

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

B. Employ skilled and experienced installer to perform alteration work.

C. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.

D. Remove unsuitable material not marked for salvage, including rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.

E. Remove debris and abandoned items from area and from concealed spaces.

F. Prepare surface and remove surface finishes to permit installation of new work and finishes.

G. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.

H. Remove, cut, and patch Work in manner to minimize damage and to permit restoring products and finishes to original or specified condition.

I. Refinish existing visible surfaces to remain in renovated rooms and spaces, to specified condition for each material, with neat transition to adjacent finishes.

J. Where new Work abuts or aligns with existing, provide smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

K. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and submit recommendation to Architect/Engineer for review.

L. Where change of plane of 1/4 inch or more occurs, request instructions from Architect/Engineer.

M. Trim existing doors to clear new floor finish. Refinish trim to specified condition.

N. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections.

O. Finish surfaces as specified in individual product sections.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Submittal procedures.

B. Construction progress schedules.

C. Proposed products list.

D. Product data.

E. Shop drawings.

F. Samples.

G. Design data.

H. Test reports.

I. Certificates.

J. Manufacturer's instructions.

K. Manufacturer's field reports.

L. Erection drawings.

1.2 SUBMITTAL PROCEDURES

A. Electronic Submittals: Prepare and transmit submittals of Product Data, Shop Drawings, Design Data, Test Reports, Certificates, Manufacturers Instructions, and Erection Drawings to Architect in electronic (.pdf) format.

B. Samples: Where specifications require the submittal of samples for verification or selection, submit physical samples and/or physical color charts to the Architect. Electronic reproductions of color charts will not be accepted. Include Contractor’s transmittal form identifying Project, Contractor, subcontractor and supplier; product designated by name indicated in specifications.

C. Transmit electronic submittals with Contractor’s transmittal form:
   1. Sequentially number submittals. Include the specification section in the submittal numbering system. Mark revised submittals with original number and sequential alphabetic suffix.
   2. Identify Project, Contractor, subcontractor and supplier; product designated by name indicated in specifications.

D. Include Contractor's certification (stamp), signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with requirements of the Work and Contract Documents.

E. Schedule submittals to expedite Project. Coordinate submission of related items.

F. For each submittal for review, allow 15 days excluding delivery time to and from Contractor. Submittals for long lead time items shall be expedited by the Contractor in order to allow for the Owner's completion schedule. Notify Architect/Engineer of long lead time items requiring expedited review.

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

H. Architect will return files electronically following review. Contractor shall distribute copies of reviewed submittals to appropriate parties.

I. Contractor shall produce and provide a paper copy of approved submittals to the Architect, and to governing authorities upon request.

J. Where specified in specific Submittals Articles, Contractor shall provide a paper copy of approved submittals to the Owner at closeout.

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

L. Submittals not requested will not be recognized or processed.

1.3 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial schedules within 7 days after Notice to Proceed. After review, resubmit required revised data within ten days.

B. Submit revised Progress Schedules with each Application for Payment.

C. Distribute copies of reviewed schedules to Project site file, subcontractors, suppliers, and other concerned parties.

D. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

E. Utilize Contractor's standard computer generated schedule format.

F. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration.

G. Indicate estimated percentage of completion for each item of Work at each submission.

H. Revisions To Schedules:
   1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
   2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.

3. Prepare narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect [including effect of changes on schedules of separate contractors].

1.4 PROPOSED PRODUCTS LIST

A. Within 7 days after Notice to Proceed, submit list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.5 PRODUCT DATA

A. Product Data: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Mark submittal to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

C. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

D. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.6 SHOP DRAWINGS

A. Shop Drawings: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. When required by individual specification sections, provide shop drawings signed and sealed by professional engineer responsible for designing components shown on shop drawings.
   1. Include signed and sealed calculations to support design.
   2. Submit drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
   3. Make revisions and provide additional information when required by authorities having jurisdiction.

D. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article and for record documents described in Section 01 70 00 - Execution and Closeout Requirements.

1.7 SAMPLES

A. Samples: Submit to Architect/Engineer for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Samples For Selection as Specified in Product Sections:

1. Submit to Architect/Engineer for aesthetic, color, or finish selection.
2. Submit samples of finishes from full range of manufacturers' standard colors, including premium and/or custom colors where specified, textures, and patterns for Architect/Engineer selection.

C. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

D. Include identification on each sample, with full Project information.

E. Submit number of samples specified in individual specification sections; Architect/Engineer will retain samples.

F. Samples will not be used for testing purposes unless specifically stated in specification section.

G. Architect will issue a schedule indicating colors selected.

1.8 DESIGN DATA

A. Submit for Architect/Engineer's knowledge as contract administrator or for Owner.

B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.9 TEST REPORTS

A. Submit for Architect/Engineer's knowledge as contract administrator or for Owner.

B. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.10 CERTIFICATES

A. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Architect/Engineer, in quantities specified for Product Data.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certificates may be recent or previous test results on material or Product, but must be acceptable to Architect/Engineer.

1.11 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, [start-up,] adjusting, and finishing, to Architect/Engineer for delivery to Owner in quantities specified for Product Data.

B. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

1.12 MANUFACTURER'S FIELD REPORTS

A. Submit reports for Architect/Engineer's benefit as contract administrator or for Owner.

B. Submit report [in duplicate] within 5 days of observation to Architect/Engineer for information.

C. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.13 ERECTION DRAWINGS

A. Submit drawings for Architect/Engineer's benefit as contract administrator or for Owner.

B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

C. Data indicating inappropriate or unacceptable Work may be subject to action by Architect/Engineer or Owner.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Quality control and control of installation.

B. Tolerances.

C. References.

D. Labeling.

E. Examination.

F. Preparation.

1.2 QUALITY CONTROL AND CONTROL OF INSTALLATION

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

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

C. When manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

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

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

F. Verify field measurements are as indicated on Shop Drawings or as instructed by manufacturer.

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

1.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.4 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date of Contract Documents, except where specific date is established by code.

C. Obtain copies of standards where required by product specification sections.

D. When specified reference standards conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.

E. Neither contractual relationships, duties, nor responsibilities of parties in Contract nor those of Architect/Engineer shall be altered from Contract Documents by mention or inference otherwise in reference documents.

1.5 LABELING

A. Attach label from agency approved by authority having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.

B. Label Information: Include manufacturer's or fabricator's identification, approved agency identification, and the following information, as applicable, on each label.
   1. Model number.
   2. Serial number.
   3. Performance characteristics.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.

B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.

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

D. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

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

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

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

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary Utilities:
   1. Temporary electricity.
   2. Temporary lighting for construction purposes.
   3. Temporary ventilation.
   4. Telephone service.
   5. Facsimile service.
   6. Temporary water service.
   7. Temporary sanitary facilities.

B. Construction Facilities:
   1. Parking.
   2. Progress cleaning and waste removal.
   3. Fire prevention facilities.

C. Temporary Controls:
   1. Barriers.
   2. Enclosures.
   3. Security.
   4. Dust control.
   5. Erosion and sediment control.
   6. Noise control.
   7. Pest control.
   8. Pollution control.
   9. Rodent control.

D. Removal of utilities, facilities, and controls.

1.2 TEMPORARY ELECTRICITY

A. Owner will pay cost of energy used. Exercise measures to conserve energy. Utilize Owner’s existing power service.

B. Provide temporary electric feeder from existing electrical service. Do not disrupt Owner's use of service.

C. Complement existing power service capacity and characteristics as required for construction operations.

D. Provide power outlets, with branch wiring and distribution boxes located at each floor as required for construction operations. Provide flexible power cords as required for portable construction tools and equipment.

E. Provide main service disconnect and over-current protection at convenient location.

F. Permanent convenience receptacles may be utilized during construction.

G. Provide distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.
   1. Provide 20 ampere duplex outlets, single phase circuits for power tools as required.
   2. Provide 20 ampere, single phase branch circuits for lighting.

1.3 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain lighting for construction operations to achieve minimum lighting level of 2 watt/sq ft.

B. Provide and maintain 1 watt/sq ft lighting to exterior staging and storage areas after dark for security purposes.

C. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps for specified lighting levels.

D. Maintain lighting and provide routine repairs.

E. Permanent building lighting may be utilized during construction.

1.4 TEMPORARY VENTILATION

A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

B. Utilize existing ventilation equipment. Extend and supplement equipment with temporary fan units as required to maintain clean air for construction operations.

1.5 TELEPHONE SERVICE

A. Provide, maintain, and pay for telephone service to field office at time of project mobilization.

1.6 FACSIMILE SERVICE

A. Provide, maintain and pay for facsimile service and dedicated telephone line to field office at time of project mobilization.

1.7 TEMPORARY WATER SERVICE

A. Owner will pay cost of temporary water. Exercise measures to conserve energy. Utilize Owner's existing water system, extend and supplement with temporary devices as needed to maintain specified conditions for construction operations.

B. Extend branch piping with outlets located so water is available by hoses with threaded connections. Provide temporary pipe insulation to prevent freezing.

1.8 TEMPORARY SANITARY FACILITIES

A. Existing designated facilities located on first or second floor may be used during construction operations. Maintain daily in clean and sanitary condition.

B. At end of construction, return existing facilities used for construction operations to same or better condition as original condition.

1.9 PARKING

A. Use of existing parking facilities by construction personnel is permitted.

B. Do not allow heavy vehicles or construction equipment in parking areas.

C. Maintain parking spaces near building access points for Owner use.

D. Maintenance:
1. Maintain traffic and parking areas in sound condition free of construction equipment, and products.
2. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original condition.

E. Removal, Repair:
1. Repair existing facilities damaged by use, to original condition.

1.10 PROGRESS CLEANING AND WASTE REMOVAL

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing spaces.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and rubbish from site weekly and dispose off-site.

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

1.11 FIRE PREVENTION FACILITIES

A. Prohibit smoking with buildings under construction and demolition. Designate area on site where smoking is permitted. Provide approved ashtrays in designated smoking areas.

B. Establish fire watch for cutting and welding and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.

C. Portable Fire Extinguishers: NFPA 10; 10 pound capacity, 4A-60B: C UL rating.
1. Provide one fire extinguisher at each stair on each floor of buildings under construction and demolition.
2. Provide minimum one fire extinguisher in every construction trailer and storage shed.
3. Provide minimum one fire extinguisher on roof during roofing operations using heat producing equipment.

1.12 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to allow for Owner's use of site, and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide barriers to separate construction areas from adjacent occupied areas.

C. Provide barricades and covered walkways required by authorities having jurisdiction for public access to existing building.

D. Provide protection for plants designated to remain. Replace damaged plants.

E. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.13 ENCLOSURES

A. Exterior Enclosures:
   1. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

B. Interior Enclosures:
   1. Provide temporary partitions and ceilings to separate work areas from Owner occupied areas, to prevent penetration of dust and moisture into Owner occupied areas, and to prevent damage to existing materials and equipment.
   2. Construction: Framing and gypsum board sheet materials with closed joints and sealed edges at intersections with existing surfaces:
      a. STC rating of 35 in accordance with ASTM E90.
      b. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.
      c. Fire Rated Wall Construction: 1 hour rating.
         1) Tested Rating: Determined in accordance with ASTM E119.
   3. Paint surfaces exposed to view from Owner occupied areas.

1.14 SECURITY

A. Security Program:
   1. Protect Work, existing premises and Owner's operations from theft, vandalism, and unauthorized entry.
   2. Initiate program in coordination with Owner's existing security system at project mobilization.
   3. Maintain program throughout construction period until Owner acceptance precludes need for Contractor security.

B. Entry Control:
   1. Owner will control entrance of persons and vehicles related to Owner's operations.

C. Restrictions:
   1. Do not allow cameras on site or photographs taken except by written approval of Owner.

1.15 DUST CONTROL

A. Execute Work by methods to minimize raising dust from construction operations.

B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

1.16 EROSION AND SEDIMENT CONTROL

1.17 NOISE CONTROL

A. Provide methods, means, and facilities to minimize noise produced by construction operations.

1.18 PEST CONTROL

A. Provide methods, means, and facilities to prevent pests and insects from damaging the Work or entering facility.

1.19 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.20 RODENT CONTROL

A. Provide methods, means, and facilities to prevent rodents from accessing or invading premises.

1.21 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary utilities, equipment, facilities, materials, prior to Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary work.

C. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Products.

B. Product delivery requirements.

C. Product storage and handling requirements.

D. Product options.

E. Product substitution procedures.

F. Equipment electrical characteristics and components.

1.2 PRODUCTS

A. Furnish products of qualified manufacturers suitable for intended use. Furnish products of each type by single manufacturer unless specified otherwise.

B. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

C. Furnish interchangeable components from same manufacturer for components being replaced.

1.3 PRODUCT DELIVERY REQUIREMENTS

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

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

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

1.4 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Store and protect products in accordance with manufacturers' instructions.

B. Store with seals and labels intact and legible.

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

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

E. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

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

G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.

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

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

1.5 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of one of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with an “Or Equal” provision: Any Product meeting the quality standards or description. Pre-bid requests for approval of Products specified with an “or equal” provision will not be acknowledged. Acceptability of “or equal” Products will be determined by the Architect during the submittal process based upon the quality or suitability of the Product proposed.

D. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit request for substitution for any manufacturer not named in accordance with the following article.

1.6 PRODUCT SUBSTITUTION PROCEDURES

A. Instructions to Bidders specify time restrictions for submitting requests for Substitutions during bidding period to requirements specified in this section.

B. Post-Bid Substitutions will only be considered when a product becomes unavailable through no fault of Contractor.

C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

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

5. Will reimburse Owner and/or Architect/Engineer for review or redesign services associated with re-approval by authorities having jurisdiction.

E. Substitutions will not be considered when they are indicated or implied on Shop Drawing or Product Data submittals, without separate written request, or when acceptance will require revision to Contract Documents.

PART 2 PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Wiring Terminations: Furnish terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Include lugs for terminal box.

B. Cord and Plug: Furnish minimum 6 foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual specification sections.

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Closeout procedures.

B. Final cleaning.

C. Starting of systems.

D. Demonstration and instructions.

E. Testing, adjusting and balancing.

F. Protecting installed construction.

G. Project record documents.

H. Operation and maintenance data.

I. Manual for materials and finishes.

J. Manual for equipment and systems.

K. Spare parts and maintenance products.

L. Product warranties and product bonds.

M. Maintenance service.

1.2 CLOSEOUT PROCEDURES

A. Submit certification that the work is Substantially Complete and approved for occupancy by the Authority Having Jurisdiction, and Contractor's list of items remaining to be completed to the Architect.

B. Architect will inspect the work and will prepare a list of items to be corrected or completed for final acceptance of the work.

C. Upon completion of correction of items included in Architect's list, submit written certification that Contract Documents have been reviewed, and that all Work is complete in accordance with Contract Documents and ready for Architect/Engineer's final review. Architect will visit the site and will verify that all items have been properly completed and/or corrected.

D. Contractor shall reimburse the Owner for all re-inspection costs incurred as a result of Contractor's failure to complete and/or correct all items identified by the Architect. Charges to the Contractor shall be made at such times and in such amounts as the Architect invoices the Owner

under the rate schedule in effect at the time of service. Such charges to the Contractor will be deducted from the Contractor's progress payment or final payment as applicable.

E. Provide submittals to Architect/Engineer required by authorities having jurisdiction.

F. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

1.3 FINAL CLEANING

A. Execute final cleaning prior to final project assessment.

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

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

D. Replace filters of operating equipment.

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

F. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.4 STARTING OF SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems.

B. Notify Architect/Engineer seven days prior to start-up of each item.

C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable [manufacturer's representative] [Contractors' personnel] in accordance with manufacturers' instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written report in accordance with Section 01 33 00 - Submittal Procedures that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

A. Refer to Mechanical and Electrical specifications for specific requirements.

B. Demonstrate operation and maintenance of products to Owner's personnel two weeks prior to date of final inspection.

C. Demonstrate Project equipment and instruct Owner’s personnel by qualified manufacturer's representative who is knowledgeable about the Project.

D. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

E. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain all aspects of operation and maintenance.

F. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at designated location.

G. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

H. Required instruction time for each item of equipment and system is specified in individual sections.

1.6 TESTING, ADJUSTING AND BALANCING

A. Refer to mechanical specifications for specific requirements.

B. Employ, and pay for services of independent firm to perform testing, adjusting, and balancing.

C. Independent firm will perform services specified in Section 23 05 93.

D. Reports will be submitted by independent firm to Architect/Engineer indicating observations and results of tests and indicating compliance or non-compliance with requirements of Contract Documents.

1.7 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual specification sections.

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

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

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

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

F. Prohibit traffic from landscaped areas.

1.8 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed Shop Drawings, Product Data, and Samples.
   6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured depths of foundations in relation to finish first floor datum.
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
   4. Field changes of dimension and detail.
   5. Details not on original Contract drawings.

G. Submit documents to Architect/Engineer with claim for final Application for Payment.

1.9 OPERATION AND MAINTENANCE DATA

A. Submit data bound in 8-1/2 x 11 inch (A4) text pages, three D side ring binders with durable plastic covers.

B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project , and subject matter of binder when multiple binders are required.

C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

E. Contents: Prepare Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
   a. Significant design criteria.
   b. List of equipment.
   c. Parts list for each component.
   d. Operating instructions.
   e. Maintenance instructions for equipment and systems.
   f. Maintenance instructions for [special] finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
3. Part 3: Project documents and certificates, including the following:
   a. Shop drawings and product data.
   b. Air and water balance reports.
   c. Certificates.
   d. Photocopies of warranties and bonds.

1.10 MANUAL FOR MATERIALS AND FINISHES

A. Submit one copy of completed volumes 15 days prior to final inspection. Draft copy will be reviewed and returned, with Architect/Engineer comments. Revise content of document sets as required prior to final submission.

B. Submit two sets of revised final volumes in final form with claim for Final Application for Payment.

C. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Include information for re-ordering custom manufactured products.

D. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

E. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.

F. Additional Requirements: As specified in individual product specification sections.

G. Include listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.11 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit one copy of completed volumes 15 days prior to final inspection. Draft copy will be reviewed and returned, with Architect/Engineer comments. Revise content of document sets as required prior to final submission.

B. Submit two sets of revised final volumes in final form with claim for Final Application for Payment.

C. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

D. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.

E. Include color coded wiring diagrams as installed.

F. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and special operating instructions.

G. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

H. Include servicing and lubrication schedule, and list of lubricants required.

I. Include manufacturer's printed operation and maintenance instructions.

J. Include sequence of operation by controls manufacturer.

K. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

L. Include control diagrams by controls manufacturer as installed.

M. Include Contractor's coordination drawings, with color coded piping diagrams as installed.

N. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

O. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

P. Include test and balancing reports as specified in Section 01 40 00 - Quality Requirements.

Q. Additional Requirements: As specified in individual product specification sections.

R. Include listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

1.12 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.

B. Deliver to and place in location as directed by Owner; obtain receipt prior to final payment.

C. Submit receipt for spare parts and maintenance products to Architect with claim for Final Application for Payment.

1.13 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.

B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.

C. Verify documents are in proper form, contain full information, and are notarized.

D. Co-execute submittals when required.

E. Include Table of Contents and assemble in three D side ring binder with durable plastic cover.

F. Submit prior to final Application for Payment.

G. Time Of Submittals:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within ten days after acceptance.
   2. Make other submittals within ten days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within ten days after acceptance, listing date of acceptance as beginning of warranty or bond period.

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END OF SECTION

SECTION 02 41 19

SELECTIVE STRUCTURE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Demolishing designated building equipment and fixtures.
2. Demolishing designated construction.
3. Cutting and alterations for completion of the Work.
4. Removing designated items for reuse and Owner's retention.
5. Protecting items designated to remain.
6. Removing demolished materials.

1.2 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Project Record Documents: Accurately record actual locations of capped utilities, concealed utilities discovered during demolition, and subsurface obstructions.

C. Operation and Maintenance Data: Submit description of system, inspection data, and parts lists.

1.3 QUALITY ASSURANCE

A. Conform to applicable code for demolition work, dust control, and products requiring electrical disconnection and re-connection.

B. Conform to applicable code for procedures when hazardous or contaminated materials are discovered.

C. Obtain required permits from authorities having jurisdiction.

1.4 SCHEDULING

A. Section 01 30 00 - Administrative Requirements: Requirements for scheduling.

B. Schedule Work to coincide with new construction.

C. Cooperate with Owner in scheduling noisy operations and waste removal that may impact Owners operation in adjoining spaces.

D. Perform noisy, malodorous, and dusty work on third floor after Owner's normal business hours.

E. Coordinate utility and building service interruptions with Owner.
1. Do not disable or disrupt building electrical, fire or life safety systems without 72 hours prior written notice to Owner.
2. Schedule tie-ins to existing systems to minimize disruption.
3. Coordinate Work to ensure fire sprinklers, fire alarms, smoke detectors, emergency lighting, exit signs and other life safety systems remain in full operation in occupied areas.

1.5 PROJECT CONDITIONS

A. Conduct demolition to minimize interference with adjacent occupied building areas.

B. Cease operations immediately if structure appears to be in danger and notify Architect/Engineer. Do not resume operations until directed.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 PREPARATION

A. Notify affected utility companies before starting work and comply with their requirements.

B. Mark location and termination of utilities.

C. Erect, and maintain temporary barriers and security devices at locations required to maintain free and safe passage to and from the building, including warning signs and lights, and similar measures, for protection of the public, Owner, and existing improvements indicated to remain.

D. Erect and maintain weatherproof closures for exterior openings.

E. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued Owner occupancy.

F. Prevent movement of structure; provide temporary bracing and shoring required to ensure safety of existing structure.

G. Provide appropriate temporary signage including signage for exit or building egress.

H. Do not close or obstruct building egress path.

I. Do not disable or disrupt building electrical, fire or life safety systems without 3 days prior written notice to Owner.

3.2 SALVAGE REQUIREMENTS

A. Coordinate with Owner to identify building components and equipment required to be removed and delivered to Owner.

B. Tag components and equipment Owner designates for salvage.

C. Protect designated salvage items from demolition operations until items can be removed.

D. Carefully remove building components and equipment indicated to be salvaged.

E. Disassemble as required to permit removal from building.

F. Package small and loose parts to avoid loss.

G. Mark equipment and packaged parts to permit identification and consolidation of components of each salvaged item.

H. Prepare assembly instructions consistent with disassembled parts. Package assembly instructions in protective envelope and securely attach to each disassembled salvaged item.

I. Deliver salvaged items to Owner. Obtain signed receipt from Owner.

3.3 DEMOLITION

A. Conduct demolition to minimize interference with adjacent occupied building areas.

B. Maintain protected egress from and access to adjacent existing buildings at all times.

C. Do not close or obstruct roadways permits.

D. Cease operations immediately when structure appears to be in danger and notify Architect/Engineer.

E. Disconnect and remove designated utilities within demolition areas.

F. Cap and identify abandoned utilities at termination points when utility is not completely removed. Annotate Record Drawings indicating location and type of service for capped utilities remaining after demolition.

G. Demolish in orderly and careful manner. Protect existing improvements, supporting structural members and items designated to remain.

H. Carefully remove building components indicated to be reused.
   1. Disassemble components as required to permit removal.
   2. Package small and loose parts to avoid loss.
   3. Mark components and packaged parts to permit reinstallation.
   4. Store components, protected from construction operations, until reinstalled.

I. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.

J. Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.

K. Remove temporary Work.

END OF SECTION

SECTION 04 73 00

SIMULATED STONE VENEER

PART 1 GENERAL

1.1 SUMMARY

A. Section includes simulated stone veneer

A. Allowances: Include under provisions of Section 01 20 00 - Price and Payment Procedures. Include and allowance of $ 12.00 per square foot for purchase of simulated stone units. Allowance includes purchase of simulated stone units only. Installation and incidental materials required for installation is included in this section and is part of Contract Sum/Price

1.2 REFERENCES

A. ASTM International:
1. ASTM C33 – Standard Specification for Concrete Aggregate.
2. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
3. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
4. ASTM C150 - Standard Specification for Portland Cement.
5. ASTM C190 - Method of Test for Tensile Strength of Hydraulic Cement Mortars.
6. ASTM C192 - Standard Practice for Making and Curing Concrete Test Specimens in the Laboratory.
7. ASTM C270 – Standard Specification for Mortar for Unit Masonry.
8. ASTM C348 - Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars.
9. ASTM C482 - Standard Test Method for Bond Strength of Ceramic Tile to Portland Cement Paste.
10. ASTM C567 - Standard Test Method for Determining Density of Structural Lightweight Concrete.
11. ASTM D226 – Standard Specification for Asphalt Saturated Organic Felt Used in Roofing and Waterproofing.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings:
1. Submit elevations, sections and details of assembly components; indicate locations, configurations, large scale plans.
2. Show connection to substrate, rough-in and anchor placement dimensions and tolerances and clearances required.
3. Show sequence of installation, attachment and anchor details, and weather sealing.
4. Show location of members, other items of work and related work of other Sections to be coordinated with the series.
5. Submit detail drawings depicting proper installation and flashing techniques. Coordinate locations with those found on the Contract Drawings.

C. Product Data: Manufacturer's data sheets on each product to be used, showing compliance with requirements.
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
   4. Cleaning methods.

D. Samples: For each finish product specified, minimum size 2 feet by 4 feet, representing actual products, styles, patterns, and textures.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Operation and Maintenance Data:
   1. Maintenance instructions.
   2. Manufacturer's warranty.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing work of this section with minimum two years documented experience and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Store and handle materials in accordance with the manufacturers written instructions.

C. Store products in manufacturer's unopened labeled packaging until ready for installation.

D. Store products in a covered, ventilated area; do not store near steam pipes, radiators, or in sunlight.

E. Prior to installation protect material from precipitation combined with freezing temperatures. Product with visible frozen moisture should not be installed.

F. Store materials on flat surface to maximum height recommended by manufacturer.

G. Store adhesive, sealant and other installation accessories in compliance recommendations of manufacturer.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

B. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

C. Proceed with work only when existing and forecasted weather conditions will permit work to be performed in accordance with manufacturer's recommendations.

1.8 SCHEDULING

A. Section 01 30 00 - Administrative Requirements: Requirements for scheduling.

B. Ensure that locating templates and other information required for installation of products of this section are furnished to affected trades in time to prevent interruption of construction progress.

C. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.9 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for warranties.

B. Warranty: Provide to the Owner an original of the manufacturer's 50 year non-transferable warranty.

PART 2 PRODUCTS

2.1 SIMULATED STONE VENEER

A. Manufacturers:
1. Boral Stone Products LLC
2. Boulder Creek Stone Products
3. Ply Gem Stone
4. Or equal.

B. Simulated Stone Veneer: Provide products manufactured meeting the following performance requirements:
1. Materials: Portland cement, lightweight aggregate, and colors from mineral oxides, in compliance with ASTM C33 and ASTM C150 material standards.
2. Compressive Strength: 1800 psi per ÅSTM C39 and ÅSTM C192.
3. Density/Weight: Not exceeding 15 pounds per square foot per ASTM C567.
4. Tensile Strength: Complies with ÅSTM C 190 after curing for 90 days.
5. Freeze Thaw Durability: Complies with ÅSTM C 67.
6. Flexural Strength: Complies with ÅSTM C 348 after curing for 28 days.
7. Shear Bond (Adhesion): Exceeding 50 psi bond strength after 28 days per ÅSTM C 482.

C. Product Description: Simulated stone veneer with units selected to match existing stone color, texture and size.

2.2 ACCESSORIES

A. Tapered Sill:
1. Size: Match existing.

2. Color: Match existing.

2.3 RELATED MATERIALS

A. Water Resistive Barrier: No. 15, Type I, asphalt saturated felt, ASTM D226.

B. Metal Lath: 2.5 lb galvanized expanded metal lath.

C. Fasteners: Minimum 1/8 inch shank diameter galvanized nails of sufficient length to penetrate 1 inch into studs.

D. Mortar: Premixed Type N, Type S or mortar mixed using components and proportions following stone manufacturer's installation instructions. Comply with ASTM C270.

E. Weep screed as required for installation over framed construction.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Do not begin installation until substrates have been properly prepared. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation.

C. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to installer. Notify Architect of unsatisfactory preparation before proceeding.

D. Verify roofs have gutters or water diffusers to direct moisture away from the stone exterior walls.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation to be free of dirt, dust, debris, and other contaminants.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions and proper relationship with adjacent construction.

B. Install related materials in accordance with type of substrate and manufactured masonry manufacturer's installation instructions.

3.4 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.

B. Clean installed veneer with a mild soap and water solution.

3.5 PROTECTION OF FINISHED WORK

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.

B. Protect installed products until completion of project. Protect finished work from ice melting salts or other chlorine based chemicals.

C. Touch-up, repair or replace damaged products before substantial completion.

END OF SECTION

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

A. Section includes structural wall; built-up structural beams and columns; wall sheathing; sill gaskets; preservative treatment of wood; miscellaneous framing and sheathing; and concealed wood blocking for support of toilet and bath accessories, wall cabinets, wood trim and other accessories.

1.2 REFERENCES

A. American National Standards Institute:
   1. ANSI A135.4 - Basic Hardboard.
   2. ANSI A208.1 - Mat-Formed Wood Particleboard.

B. American Wood-Preservers' Association:
   1. AWPA M4 - Standard for the Care of Preservative-Treated Wood Products.
   2. AWPA U1 - Use Category System: User Specification for Treated Wood.

C. ASTM International:
   1. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   2. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel
   3. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
   4. ASTM C1280 - Standard Specification for Application of Gypsum Sheathing.
   5. ASTM C1396/C1396M - Standard Specification for Gypsum Board.
   6. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
   7. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
   8. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

D. California Department of Health Services:
   1. CA/DHS/EHLB/R-174 - Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

E. National Lumber Grades Authority:
   1. NLGA - Standard Grading Rules for Canadian Lumber.

F. Northeastern Lumber Manufacturers Association:
   1. NELMA - Standard Grading Rules for Northeastern Lumber.

G. The Redwood Inspection Service:
   1. RIS - Standard Specifications for Grades of California Redwood Lumber.

H. Southern Pine Inspection Bureau:
   1. SPIB - Standard Grading Rules for Southern Pine Lumber.

I. U.S. Department of Commerce National Institute of Standards and Technology:

1. DOC PS 1 - Construction and Industrial Plywood.
2. DOC PS 2 - Performance Standard for Wood-Based Structural-Use Panels.
3. DOC PS 20 - American Softwood Lumber Standard.

J. West Coast Lumber Inspection Bureau:
1. WCLIB - Standard Grading Rules for West Coast Lumber.

K. Western Wood Products Association:
1. WWPA G-5 - Western Lumber Grading Rules.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Samples of Exposed To View Wood Members: Submit two samples illustrating wood grain, stain, and finish.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with the following:
1. Lumber Grading Agency: Certified by DOC PS 20.
2. Wood Structural Panel Grading Agency: Certified by EWA - The Engineered Wood Association.
3. Lumber: DOC PS 20.
4. Wood Structural Panels: DOC PS 1 or DOC PS 2.

B. In lieu of grade stamping exposed to view lumber and wood structural panels, submit manufacturer's certificate certifying Products meet or exceed specified requirements.

C. Apply label from agency approved by authority having jurisdiction to identify each preservative treated material.

PART 2 PRODUCTS

2.1 LUMBER MATERIALS

A. Lumber Grading Rules: NLGA.

B. Beam Framing (2x6 through 4x16): SPF species, #2 or better grade, 19 percent maximum moisture content.

C. Rafter Framing (2x6 through 4x16): SPF species, #2 or better grade, 19 percent maximum moisture content.

D. Non-structural Light Framing (2x2 through 2x6): SPF species, #2 or better grade, percent maximum moisture content.

E. Studding (2x2 through 2x6): SPF species, #2 or better grade, 19 percent maximum moisture content.

F. Wall sill plates in contact with concrete or masonry: SYP, #2 or better, pressure preservative treated.

G. Miscellaneous Framing: SPF species, #2 or better grade 19 percent maximum moisture content.

2.2 SHEATHING MATERIALS

A. Wood Structural Panel Wall Sheathing for above grade locations: 15/32 Performance Category, EWA Rated Oriented Strand Board, Span Rating 24/0; Exposure Durability 1; unsanded.

B. Wood Structural Panel Wall Sheathing for installation within 8 inches of exterior finish grade: 15/32 Performance Category, EWA Rated Plywood, Span Rating 24/0; Exposure Durability 1; unsanded, pressure preservative treated for ground contact.

2.3 ACCESSORIES

A. Fasteners and Anchors:
1. Fasteners: ASTM A153/A153M, hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
2. Anchors: Epoxy screen tube and bolt for anchorage to hollow masonry. Expansion shield and lag bolt type for anchorage to solid masonry or concrete. Bolt for anchorages to steel.

B. Building Paper: ASTM D226; Type I, No. 15 unperforated asphalt felt.

2.4 FACTORY WOOD TREATMENT

A. Wood Preservative (Pressure Treatment): AWPA U1, Commodity Specification A-Sawn Products or F-Wood Composites using water-borne preservative.

B. Wood Preservative (Surface Application): Clear type of same composition as treatment.

C. Moisture Content After Treatment: Redried.
1. Lumber: Maximum 19 percent.
2. Structural Panels: Maximum 15 percent.

PART 3 EXECUTION

3.1 FRAMING

A. Set structural members level and plumb, in correct position.

B. Fasten framing in accordance with applicable code.

C. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in alignment until completion of erection and installation of permanent bracing.

D. Place horizontal members, crown side up.

E. Construct load bearing framing and curb members full length without splices.

F. Double members at openings over 16 inches wide. Space short studs over and under opening to stud spacing.

G. Construct double joist headers at floor and ceiling openings and under wall stud partitions parallel to floor joists. Frame rigidly into joists.

H. Bridge rafter and joist framing in excess of 8 feet span at mid-span. Fit solid blocking at ends of members.

3.2 SHEATHING

A. Install gypsum sheathing in accordance with ASTM C1280.

B. Fasten sheathing in accordance with applicable code.

C. Secure wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered.

D. Place building paper horizontally over wall sheathing; weather lap edges and ends.

3.3 SITE APPLIED WOOD TREATMENT

A. Apply preservative treatment in accordance with manufacturer's instructions.

B. Treat site-sawn cuts. Apply preservative to site-sawn cuts in accordance with AWPA M4.

C. Allow preservative to dry prior to erecting members.

3.4 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Framing Members: 1/4 inch from indicated position, maximum.

C. Surface Flatness of Floor: 1/4 inch in 10 feet maximum, and 1/2 inch in 30 feet maximum.

END OF SECTION

SECTION 06 20 00

FINISH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior Finish Carpentry:
      a. Standing and running trim.
      b. Plastic Laminate Wall Panels.

B. Related Requirements:
   1. Section 06 10 00 – Rough Carpentry: Blocking and support framing.
   2. Section 08 52 00 - Wood Windows.
   3. Section 09 90 00 - Painting and Coating: Painting and finishing of finish carpentry items.

1.2 REFERENCE STANDARDS

A. American National Standards Institute:
   1. ANSI A208.1 - Mat-Formed Wood Particleboard.

B. APA-The Engineered Wood Association:
   1. APA/EWA PS 1 - Voluntary Product Standard for Construction and Industrial Plywood.

C. ASTM International:
   1. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
   3. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

D. Architectural Woodwork Institute:
   1. AWI AWS - Architectural Woodwork Standards.

E. National Electrical Manufacturers Association:
   1. NEMA LD 3 - High Pressure Decorative Laminates.

F. U.S. Department of Commerce National Institute of Standards and Technology:
   1. DOC PS 20 - American Softwood Lumber Standard.

G. Window and Door Manufacturers Association:
   1. WDMA I.S.4 - Water-Repellent Treatment for Millwork.

1.3 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate work with installation of associated and adjacent components.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data:
   1. Submit data on preservative treatment materials and application instructions.
   2. Submit data on plastic finish carpentry products.

C. Shop Drawings:
   1. Indicate materials, component profiles, fastening methods, jointing details, and accessories.

D. Samples:
   1. Submit sample of wood trim 10 inch long.
   2. Submit samples of laminates and shop finishes requiring selection of finish, color, texture and other properties.

1.5 QUALITY ASSURANCE

A. Perform work in accordance with AWI AWS Section 6 Custom Grade.

B. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

C. Apply label from agency approved by authority having jurisdiction to identify each preservative treated material.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Fabricator: Company specializing in fabricating products specified in this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Protect work from moisture damage.

C. Maintain storage space relative humidity within ranges indicated in AWI AWS Section 2.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. During and after installation of Work of this section, maintain same temperature and humidity conditions in building spaces as will occur after occupancy.
   1. Maintain relative humidity within ranges indicated in AWI AWS Section 2.

1.9 EXISTING CONDITIONS

A. Verify field measurements prior to fabrication. Indicate field measurements on shop drawings.

PART 2 PRODUCTS

2.1 INTERIOR FINISH CARPENTRY

A. Interior Standing and Running Trim: Softwood lumber.
   1. Profile: Sizes and profiles to match existing.
   2. Transparent Finished Trim: AWI AWS Section 6; Custom Grade.

2.2 INTERIOR MATERIALS

A. Interior Softwood Lumber: DOC PS 20; Douglas fir species.
   1. Cut: Plain sawn.
   2. Finger Jointing: Not permitted.

B. Interior Hardwood Lumber: Red oak species.
   1. Cut: Plain sawn.
   2. Finger Jointing: Not permitted] [Permitted].

C. Lumber Moisture Content Range: 5-10 percent.

D. High Pressure Decorative Laminate (HPDL): NEMA LD 3, color, pattern, and surface texture as selected.
   1. Horizontal Surfaces: HGS; 0.048 inches thick.
   2. Vertical Surfaces: VGS; 0.028 inches thick.
   3. Fire Resistant Surfaces: HGF; 0.048 inches thick.
   4. Backing Sheet: BKL; 0.020 inches thick.

E. Particleboard: ANSI A208.1 Grade M2 or better; composed of wood chips or sawdust, medium density, made with water resistant adhesive; sanded faces.

2.3 FABRICATION

A. Fabricate finish carpentry to AWI AWS Section 6 Custom Grade.

B. Shop assemble work for delivery to site, permitting passage through building openings.

C. When necessary to cut and fit on site, fabricate materials with ample allowance for cutting. Furnish trim for scribing and site cutting.

D. Apply high pressure decorative laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners.]
   1. Apply laminate backing sheet to reverse face of high pressure decorative laminate finished surfaces.
   2. Cap exposed edges with plastic trim.

2.4 FINISHES

A. Sand work smooth and set exposed nails and screws.

B. Apply wood filler in exposed nail and screw indentations.

C. On items to receive transparent finishes, use wood filler matching surrounding surfaces and of types recommended for applied finishes.

D. Stain, seal, and varnish exposed to view surfaces.

E. Seal internal surfaces and semi-concealed surfaces.

F. Seal surfaces in contact with cementitious materials.

2.5 ACCESSORIES

A. Adhesive for High Pressure Decorative Laminates: Type recommended by laminate manufacturer to suit application.

B. Wall Adhesive: Cartridge type, compatible with wall substrate, capable of achieving durable bond.

C. Fasteners and Anchors:
1. Fasteners: ASTM A153/A153M, hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
2. Nails and Staples: ASTM F1667.

D. Concealed Joint Fasteners: Threaded steel.

E. Lumber for Shimming and Blocking: Softwood lumber of any species.

F. Sealant for backsplash to counter joint: Clear silicone sealant (Type S); ASTM C920, single component, mildew resistant, fungus resistant, chemical curing, non-sagging, non-staining, non-bleeding; formulated for use in conjunction with plumbing fixtures, ceramic tile and other conditions where high humidity and temperature extremes are anticipated; equal to Type 795 as manufactured by Dow Corning Company.

G. Veneer Edge Band: AWI AWS; standard wood veneer edge band matching face veneer.

H. Plastic Edge Trim: AWI AWS; PVC; color as selected.

I. Primer: Acrylic primer sealer type.

J. Wood Filler: Solvent base, tinted to match surface finish color.

K. Aluminum Standoffs: 1-1/2 inch diameter x length indicated, aluminum standoff equal to Standoff Systems Basic Standoff.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify adequacy of backing and support framing.

C. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.2 PREPARATION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation preparation.

B. Prime paint surfaces of wood items and assemblies to be in contact with cementitious materials.

3.3 DEMOLITION

A. Modify and extend existing finish carpentry installations using materials and methods as specified.

3.4 INSTALLATION

A. Install work in accordance with AWI AWS Section 6 Custom Grade and manufacturer's instructions.

B. Set and secure materials and components in place, plumb and level.

C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

D. Install components and trim with nails, screws, bolts or with blind fasteners as indicated.

E. Install prefinished paneling with full bed contact adhesive applied to substrate.

F. Site Applied Wood Treatment:
   1. Brush apply one coat of preservative treatment on wood in contact with cementitious materials, roofing and related metal flashings.
   2. Treat site-sawn cuts. Apply preservative to site-sawn cuts in accordance with WDMA I.S.4.
   3. Allow preservative to dry prior to erecting members.

G. Preparation For Site Finishing:
   1. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.
   2. Site Finishing: Refer to Section 09 90 00.

3.5 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Conform to AWI AWS Section 6 requirements for the following:
   1. Smoothness.
   2. Gaps.
   3. Flushness.
   4. Flatness.

END OF SECTION

SECTION 06 41 00

ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Plastic laminate finished casework.
2. Plastic laminate finished counter tops.
3. Cabinet hardware.

B. Related Requirements:
1. Section 06 10 00 – Rough Carpentry: Blocking and support framing.
2. Section 06 20 00 - Finish Carpentry: Standing and running trim not specified in this section.
3. Section 07 90 00 – Joint Protection: Sealants for countertop installation.
4. Section 15 41 00 – Plumbing Fixtures: Plumbing fixtures.

1.2 REFERENCE STANDARDS

A. American National Standards Institute:
1. ANSI A135.4 - Basic Hardboard.
2. ANSI A156.9 - Cabinet Hardware.
3. ANSI A208.1 - Mat-Formed Wood Particleboard.

B. APA-The Engineered Wood Association:
1. APA/EWA PS 1 - Voluntary Product Standard for Construction and Industrial Plywood.

C. Architectural Woodwork Institute:
1. AWI AWS - Architectural Woodwork Standards.

D. ASTM International:
1. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
2. ASTM B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel
3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
4. ASTM F1667 - Standard Specification for Driven Fasteners: Nails, Spikes, and Staples.

E. National Electrical Manufacturers Association:
1. NEMA LD 3 - High Pressure Decorative Laminates.

F. U.S. Department of Commerce National Institute of Standards and Technology:
1. DOC PS 20 - American Softwood Lumber Standard.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data:
1. Submit data for hardware accessories.

C. Shop Drawings:
   1. Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.

D. Samples:
   1. Submit samples of laminates and shop finishes requiring selection of finish, color, texture and other properties.
   2. Submit samples of drawer pulls, and hinges illustrating hardware finish.

1.4 QUALITY ASSURANCE

A. Perform work in accordance with AWI AWS, Section 10 and Section 11; Custom grade.

B. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

1.5 QUALIFICATIONS

A. Fabricator: Company specializing in fabricating products specified in this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Protect units from moisture damage.

C. Maintain storage space relative humidity within ranges indicated in AWI AWS Section 2.

1.7 AMBIENT CONDITIONS

A. Section 01 50 00 - Temporary Facilities and Controls: Ambient conditions control facilities for product storage and installation.

B. During and after installation of Work of this section, maintain same temperature and humidity conditions in building spaces as will occur after occupancy.
   1. Maintain relative humidity within ranges indicated in AWI AWS Section 2.

1.8 EXISTING CONDITIONS

A. Verify field measurements prior to fabrication. Indicate field measurements on shop drawings.

PART 2 PRODUCTS

2.1 CUSTOM CASEWORK

A. Fabricators:
   1. Cabinets by Robert, Traverse City, MI
   2. Cedar Valley Cabinets, Traverse City, MI.
   3. Eyewood Design, Interlochen, MI.
   4. Substitutions permitted under section 01 60 00.

B. Plastic Laminate Finished Custom Casework: Frameless construction; flush overlay style; AWI AWS Section 10; Custom Grade.
   1. Exterior and Interior Surfaces: High pressure decorative laminate over M-3 47# density particleboard.
   2. PVC edges applied with hot melt adhesive.
   3. Epoxy coated, self closing, 100# rated drawer slides with lifetime warranty.
   4. Non-racking, non-deflecting platform drawer box with 1/2” thick bottoms. Blum Metabox drawer system is acceptable.
   5. Thermally fused laminate interior.
   6. Separate individual, factory applied, full support base construction.

C. Plastic Laminate Finished Counter Tops: AWI AWS Section 11; Custom Grade.
   1. Core: M-3 47# density Particleboard.
      a. Core at Sink Tops: Exterior or exterior glue type panels.
   2. Splash Top Profile: Square.
   3. Deck at Splash Joint Type: Horizontal butt.
   4. Splash Assembly: Field assembled.

2.2 MATERIALS

A. All particleboard shall be Grade M-3 Industrial, according to the American National Standard (ANSI) for Mat-Formed Wood Particleboard, ANSI-A208.1 and shall meet or exceed the following:

1.	Density	47 lbs/cu.ft.
2.	Moisture Content	6%
3.	Modules of Rupture	2400 psi
4.	Modules of Elasticity	450,000 psi
5.	Internal Bond	80 psi
6.	Hardness	900 pounds
7.	Linear Expansion	0.30%
8.	Thickness Tolerance	+/- 0.005”
9.	Face Screw Holding	325 pounds
10.	Edge Screw Holding	275 pounds

B. High Pressure Decorative Laminate (HPDL): NEMA LD 3; color, pattern, and surface texture as selected.
   1. Horizontal Surfaces: HGS; 0.048 inches thick.
   2. Vertical Surfaces: VGS; 0.028 inches thick.
   3. Post-Formed Surfaces: HGP; 0.039 inches thick.
   4. Cabinet Liner: CLS; 0.020 inches thick.
   5. Backing Sheet: BKL; 0.020 inches thick

C. Hardware:
   1. Door and Drawer Pulls:
      a. "U" shaped pull, aluminum with satin finish, 4 inch centers.
      b. One pull shall be located at the centerline of the drawer, regardless of width, to ensure ease of operation and maximize drawer slide life.
   2. 5 Knuckle Hinges:
      a. Hinges shall be .95” steel five-knuckle hospital-tip institutional grade quality with .187” diameter tight pin. Residential, kitchen type pivot, plain butt, or hinges with removable pins “SHALL NOT BE ACCEPTABLE”. Each hinge shall be secured with a minimum of nine No. 8 screws. Hinge shall permit door to swing 270 degrees without binding. Doors less than 48” in height shall have two hinges. Doors over 48” in height shall have three hinges.
   3. Drawer Slides:

a. Standard Drawer: Self closing, bottom mount epoxy coated with captive roller and positive in stop. Slide shall have 100# rating, must be self closing within last 3" of travel, and must prevent drawer fronts from contacting the cabinet body.
b. File Drawers: Full extension, bottom mount epoxy coated with captive roller and positive instop. Slide shall have 100# rating, must be full extension, and prevent drawer fronts from contacting the cabinet body.
c. File drawers shall be equipped with "Pendaflex" file frames.

4. Door Catches:
   a. Base and Wall Cabinets: 7 pound magnetic catch.
   b. Tall Cabinets: Heavy duty spring loaded roller, with molded plastic bumper.
5. Adjustable Shelf Supports:
   a. Shelf supports shall be injected molded clear plastic, with a double pin engagement 32mm on center and shall have 3/4" and 1" anti-tip locking tabs.
6. Locks: (Where shown or noted only)
   a. National Lock five disc tumbler cam locks in chrome finish.
   b. Key locks according to Owner's specific keying requirements.
   c. Lock core is removable with a control key, permitting OWNER to easily change lock arrangements without tools.
   d. Inactive door of base and wall cabinets shall be secured by using an elbow catch or a chain bolt for tall cabinets.

2.3 FABRICATION

A. Fabricate casework to AWI AWS Section 10 Custom Grade.

B. Fabricate counter tops to AWI AWS Section 11 Custom Grade.

C. Exterior Vertical Surfaces:
1. All door and drawer fronts, finished end panels, and exposed exterior backs shall be surfaced with .028" thick high-pressure decorative laminate conforming to NEMA LD3, VGS.
2. A minimum of 300 solid colors and 6 woodgrains shall be offered. A maximum of 5 colors may be selected per project. Solid colors shall be from Wilsonart, or Pionite.
3. All exterior vertical high-pressure laminate panels shall be balanced with textured .020" thick high- pressure cabinet liner conforming to NEMA Standard LD3 CLS. Color shall match interior, Light Beige, Greystone, or White.
4. All high-pressure laminate must be laminated using a PVA adhesive, set under pressure, resulting in a rigid glue line. Contact adhesives shall not be used.
5. HPL at all open interiors, underside of wall cabinet bottoms, interiors of glazed door cabinets shall be considered exposed and finished in Decorative High-Pressure VGS laminate.

D. Thermally Fused Interiors at Semi-Exposed Surfaces:
1. Interior surfaces behind doors, drawer boxes, backs, and unfinished ends shall be laminated with a Light Beige, Greystone, or White thermally fused laminate that meets or exceeds the performance standards for NEMA LD3 for VGS. All panels shall be of "BALANCED" construction. Fast cycle thermally fused, melamine foil or polyester surfaced panels or other surface types that do not meet these requirements are not acceptable.

E. 3mm & .020" PVC Edges:
1. Door and drawer edging shall be 3mm PVC. The PVC shall be applied utilizing hot melt adhesive and radiused by automatic trimmers. Hand tool applying and trimming of PVC shall not be allowed. Edging shall be available in coordinated color options. One selection per color cabinet color scheme.

2. Other edges shall be machine applied color through .020” PVC. Cabinet body edges shall match the door/drawer edge color selection. The leading edge of adjustable shelves shall be edged with .020” PVC matching the interior color.

F. All cabinet body components shall be secured using manufacturer’s standard fabrication method.

G. All joints to be tight fitting and resist rupture or loosening due to the following:
1. Dimensional changes in the particleboard.
2. Racking of casework during shipment and installation.
3. Normal use.
4. Seismic shock as tested and approved by the Woodwork Institute of California for casework used in schools and hospitals.
5. All fastening devices and screws shall be treated to deter or resist corrosion.

H. Construction Features – All Cabinets:
1. All structural components shall be 3/4” thick particleboard with balanced surfaces.
2. All back panels shall be 1/2” thick particleboard surfaced both sides for balanced construction.
3. All drawer components shall be 1/2” thick particleboard with balanced surfaces.
4. Mounting stretchers are 3/4” thick structural components fastened to end panels by mechanical fasteners, and are concealed by the cabinet back.
5. When cabinet backs are exposed a finished 3/4” thick decorative laminate back panel shall be substituted for stretchers.
6. Particleboard core individual bases, factory applied to base and tall cabinets shall support and carry the load of the end panels, and the cabinet bottom, directly to the floor. The base shall be let in from the sides and back of the cabinet to allow cabinets to be installed tightly together and tight against a wall. Also to conceal the top edge of applied vinyl base molding. There shall be a front to back center support for all bases over 30” wide.
7. Horizontal parting rails between drawers shall be 3/4” particleboard with balanced surfaces, secured to and further reinforcing cabinet ends. When drawer stacks are keyed individually the parting rail shall run full depth of cabinet to prevent pilfer.
8. A 5mm diameter row hole pattern 32mm (1-1/4”) on center shall be bored in cabinet ends for adjustable shelves. This row hole pattern shall also serve for hardware mounting and replacement and/or relocation of cabinet components.
9. All door and drawer fronts and finished ends shall be balanced construction with “high-pressure” laminate bonded to both sides of a M-3, 47# particle board core.
10. Adjustable shelves shall be particleboard core, balanced surfaces and have a .020” thick PVC front edge matching the shelf.
    a. Adjustable shelves in cabinets over 36” wide shall be 1” thick.
    b. All adjustable shelves in open cabinets shall be 1” thick.
    c. All other shelves shall be 3/4” thick.
11. Fixed Interior Components such as fixed shelves, dividers, and cubicle compartments shall be full 3/4” thick particleboard attached with concealed interlocking mechanical fasteners.
12. All doors shall be a maximum of 24” wide.

I. Wall Cabinets:
1. All wall cabinet bottoms shall be of 1” thick particleboard core mechanically fastened to end panels and secured to the bottom back stretcher.
2. An upper 3/4“ thick stretcher shall be located behind the back panel. and secured to the cabinet top.
3. A lower 3/4” thick stretcher shall be located behind the back panel and attached to the end panels.

J. Base Cabinets:

1. All base cabinets, except sink cabinets, shall have a solid 3/4” thick sub-top fastened to the ends with interlocking mechanical fasteners.
2. All sink cabinets shall have a vertically mounted front stretcher panel supporting the countertop, a split removable back panel and four steel corner gussets used to secure the counter-top.
3. An upper 3/4” thick stretcher shall be located behind the back panel and attached to the end panels.

K. Tall Cabinets:
1. An intermediate fixed shelf shall be provided on all general storage cabinets to maintain internal dimensional stability under heavy loading conditions.
2. A 3/4” top and intermediate stretcher shall be located behind the back panels and attached to the end panels.
3. The intermediate stretcher is secured to the intermediate shelf, thus capturing the back panel.

L. Drawers:
1. Drawer box shall be constructed with a full 1/2” thick non-racking, non-deflecting platform bottom which is carried directly by “L” shaped, bottom mount drawer glides.
2. Sides, back, sub-front and bottom shall be 1/2” thick 47# density particleboard surfaced both faces with Light Beige, Greystone, or White thermally fused laminate per 2.02.B.1. The top edge shall be .020” PVC matching the drawer color.
3. Corners shall be joined with fluted wood dowels and glue, minimum 32mm o/c.
4. Drawer fronts shall be removable and attached drawer box sub-front with screws from inside of drawer.
5. Blum Metabox drawer systems are acceptable.

M. Countertops:
1. High Pressure Laminate: NEMA Standard LD 3 HGS, color, pattern, and surface texture as selected.
2. Laminate bonded to 1 1/8” thick M3 47# particleboard. Core shall be balanced with HPL backer.
3. All joints shall be secured with adhesive and tight joint fasteners.
4. Provide 4” high splashes as required.

N. Shop assemble casework for delivery to site in units easily handled and to permit passage through building openings.

O. [Shop glaze glass materials using Interior [Dry] [Combination] [Wet] method specified in Section 08 80 00.]

2.4 ACCESSORIES

A. Adhesive for High Pressure Decorative Laminates: Type recommended by laminate manufacturer to suit application.

B. Fasteners and Anchors:
1. Fasteners: ASTM A153/A153M, hot dipped galvanized steel for high humidity and treated wood locations, unfinished steel elsewhere.
2. Nails and Staples: ASTM F1667.

C. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application.

D. Concealed Joint Fasteners: Threaded steel.

E. Grommets: Plastic material for cut-outs.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify adequacy of backing and support framing.

C. Verify location and sizes of utility rough-in associated with work of this section.

3.2 INSTALLATION

A. Set and secure casework and counter tops in place; rigid, plumb, and level.

B. Use fixture attachments in concealed locations for wall mounted components.

C. Use concealed joint fasteners to align and secure adjoining cabinet units and counter tops.

D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.

E. Secure cabinet and counter bases to floor using appropriate angles and anchorages.

F. Install backsplashes to wall surface and counter top. Apply bead of sealant to joints and run smooth.

3.3 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Variation from Indicated Position: 1/16 inch.

C. Maximum Offset from Alignment with Abutting Materials: 1/32 inch.

3.4 ADJUSTING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for starting and adjusting.

B. Adjust moving or operating parts to function smoothly and correctly.

3.5 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.

B. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

SECTION 07 46 33

PLASTIC SIDING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Preformed vinyl siding system for walls, and accessory components.
2. Secondary moisture barrier over substrate.

B. Related Sections:
1. Section 06 10 00 – Rough Carpentry: Exterior wall sheathing.
2. Section 07 90 00 – Joint Protection: Exterior sealants.

1.2 REFERENCES

A. ASTM International:
1. ASTM D226 – Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
2. ASTM D 2244 – Standard Calculation for Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates.
3. ASTM D3679 - Standard Specification for Rigid Polyvinyl Chloride (PVC) Siding.

1.3 SYSTEM DESCRIPTION

A. System: Preformed vinyl siding system of horizontal profile as indicated on the drawings.

1.4 DESIGN REQUIREMENTS

A. Components: Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall to a design pressure of 30 lb/sq.ft.

B. Maximum Allowable Deflection of Panel: 1/180 of span.

C. Movement: Accommodate movement within system without damage to components or deterioration of seals, movement within system; movement between system and perimeter components when subject to seasonal temperature cycling; dynamic loading and release of loads; deflection of structural support framing.

D. Drainage: Provide positive drainage to exterior for moisture entering or condensation occurring within panel system.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Product Data: For each type of product specified. Include identification of materials, dimensions of individual components, installation instructions and available profiles, textures and colors.

C. Samples: Submit two (2) samples of siding, illustrating finish color, sheen, and texture.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements..

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum three (3) years documented experience.

B. Installer: Company specializing in performing the work of this section with minimum three (3) years documented experience and/or as approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Store siding material off ground protected from weather, to prevent twisting, bending, or abrasion.

C. Prevent contact with materials which may cause discoloration or staining.

1.8 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate the Work for installation of surrounding materials, soffits and sub-fascia components or materials.

C. Coordinate the Work with installation of flashing components or materials.

1.9 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for warranties.

B. Provide Warranty to correct defective Work within a fifty (50) year period after Substantial Completion for degradation of panel finish including color fading caused by exposure to weather as defined and measured according to ASTM D 2244.

PART 2 PRODUCTS

2.1 SIDING MATERAILS

A. Formed Vinyl Siding: Solid vinyl siding and accessories complying with ASTM D3679.
   1. Horizontal Pattern: [4 inch shiplap] [Match exisiting].
   2. Texture: [Wood grain] [Match existing].
   3. Color: [As selected] [Match existing].

2.2 COMPONENTS

A. Internal and External Corners: Same material, thickness, and finish as siding; profile to suit system.

B. Door and Window Trim, Inside/Outside Corner Post, Finish Trim, Starter Strip, J-Channel, F-Channel (Freeze Runner): Same material, thickness and finish as siding.

2.3 ACCESSORIES

A. Secondary Moisture Barrier: Secondary moisture barrier [meeting or exceeding the requirements of ASTM D226 for Type 1 felt] [consisting of Spun bonded polyolefin sheeting], approved by the authority having jurisdiction.

B. Sealants: Specified in Section 07900. Manufacturer's standard type suitable for use with installation of system, color to match panel system.

C. Fasteners: Manufacturer's standard type to suit application. Exposed fasteners same finish as panel system.

PART 3 EXECUTION

3.1 EXISTING WORK

A. Extend existing siding installations using materials and methods compatible with existing installations.

B. Clean and repair existing remaining siding and accessories.

3.2 INSTALLATION

A. Install secondary moisture barrier in such a manner as to provide a continuous water resistive barrier behind the exterior wall veneer. Comply with manufacturers installation instructions.

B. Install vinyl siding system on walls in accordance with manufacturer's instructions.

C. Fasten siding to structural support; aligned, level, and plumb.

D. Use concealed fasteners unless otherwise approved by Architect.

E. Seal and place gaskets to prevent weather penetration. Maintain neat appearance.

3.3 TOLERANCES

A. Section 01 40 00 Quality Requirements.

B. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.

C. Maximum Variation from Plane or Location Indicated on Drawings: 1/8 inch.

3.4 CLEANING

A. Section 01 70 00 Execution and Closeout Requirements.

B. Remove site cuttings from finish surfaces.

C. Clean and wash surfaces with mild soap and water; rinse with clean water.

END OF SECTION

SECTION 07 90 00

JOINT PROTECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes sealants and joint backing and accessories.

B. Related Sections:
1. Section 06 20 00 – Finish Carpentry: Sealants required in conjunction with finish carpentry.

1.2 REFERENCES

A. ASTM International:
1. ASTM C834 - Standard Specification for Latex Sealants.
2. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications.
3. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
4. ASTM C1193 - Standard Guide for Use of Joint Sealants.
5. ASTM D1056 - Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber.
6. ASTM D1667 - Standard Specification for Flexible Cellular Materials-Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam).
7. ASTM D2628 - Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Products Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

C. Samples: Submit two samples illustrating sealant colors for selection.

D. Manufacturer's Installation Instructions: Submit special procedures, surface preparation, and perimeter conditions requiring special attention.

E. Warranty: Include coverage for installed sealants and accessories failing to achieve watertight seal, exhibit loss of adhesion or cohesion, and sealants which do not cure.

1.4 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Applicator: Company specializing in performing Work of this section with minimum three years documented experience.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

1.6 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate Work with sections referencing this section.

PART 2 PRODUCTS

2.1 JOINT SEALERS

A. Manufacturers:
1. Dow Corning Corp.
2. Pecora Corp..
3. Sika Corp..
4. Tremco Sealants & Waterproofing.
5. Substitutions: Or equal.

B. Products Description:

1. High Performance General Purpose Exterior Sealant: Polyurethane; ASTM C920, Grade NS, Class 25, Uses M, G, and A; multi-component.
   a. Acceptable Products:
      1) Dymeric 240FC manufactured by Tremco.
      2) Sikaflex-2c NS manufactured by Sika Corp.
      3) Dynatrol II by Pecora Corporation.
   b. Color: Standard colors matching finished surfaces.
   c. Applications: Use for:
      1) Joints between concrete and other materials.
      2) Joints between metal frames and other materials.
      3) Other exterior nontraffic joints for which no other sealant is indicated.

2. General Purpose Traffic Bearing Sealant: Polyurethane; ASTM C920, Grade P, Class 25, Use T; single component.
   a. Acceptable Products
      1) Vulkem 45 manufactured by Tremco.
      2) Sikaflex-1c SL manufactured by Sika Corp.
      3) DynaTrol II-SG manufactured by Pecora Corp.
   b. Color: Standard colors matching finished surfaces.
   c. Applications: Use for exterior and interior pedestrian traffic bearing joints.

3. Exterior Metal Lap Joint Sealant: Butyl, non-drying, non-skinning, non-curing.
   a. Acceptable Products
      1) Butyl Sealant manufactured by Tremco.
      2) Pecora BA-98 manufactured by Pecora Corp.
   b. Applications: Use for concealed sealant bead in sheet metal work.

4. Interior Silicone Sealant: Polyurethane; ASTM C920, Grade NS, Class 25, Uses M, G, and A; single component.
   a. Acceptable Products:
      1) Dow Corning 795 manufactured by Dow Corning Corp.

2) Pecora 864NST manufactured by Pecora Corp.
b. Applications: Use for interior wall and ceiling control joints subject to thermal or dynamic movement.

5. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, single component, paintable.
   a. Acceptable Products:
      1) TremFlex 834 manufactured by Tremco.
      2) Pecora AC-20 + Silcone manufactured by Pecora Corp.
   b. Color: Standard colors matching finished surfaces.
   c. Applications: Joints between door and window frames and wall surfaces, and other interior joints for which no other type of sealant is indicated.

6. Bathtub/Tile Sealant: White silicone; ASTM C920, Uses M and A; single component, mildew resistant.
   a. Acceptable Products:
      1) Tremsil 200 manufactured by Tremco.
      2) Pecora 898 manufactured by Pecora Corp.
      3) Dow Corning 786 manufactured by Dow Corning Corp.
   b. Applications: Use for joints between plumbing fixtures and floor and wall surfaces, and joints between kitchen and bathroom toilet room counter tops and wall surfaces.

7. Acoustical Sealant: Butyl sealant; single component, solvent release curing, non-skinning.
   a. Acceptable Products:
      1) Acoustical Sealant manufactured by Tremco.
      2) Pecora BA-98 manufactured by Pecora Corp.
   b. Applications: Use for concealed locations only at acoustically rated construction.
      1) Provide sealant bead between wall sole plate and floor.

2.2 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: Round foam rod compatible with sealant; ASTM D1056, sponge or expanded rubber; oversized 30 to 50 percent larger than joint width.
   1. Type: Everlastic manufactured by Williams Products, Inc. or equal.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify substrate surfaces and joint openings are ready to receive work.

C. Verify joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

A. Remove loose materials and foreign matter impairing adhesion of sealant.

B. Clean and prime joints.

C. Perform preparation in accordance with ASTM C1193.

D. Protect elements surrounding Work of this section from damage or disfiguration.

3.3 INSTALLATION

A. Perform installation in accordance with ASTM C1193.

B. Perform acoustical sealant application work in accordance with ASTM C919.

C. Install bond breaker where joint backing is not used.

D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

F. Tool joints concave.

3.4 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.

B. Clean adjacent soiled surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.

B. Protect sealants until cured.

END OF SECTION

SECTION 08 12 14

STANDARD STEEL FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes fire rated and non-rated steel frames.
   1. Provide frames for interior glazed lights.

B. Related Sections:
   1. Section 07 90 00 – Joint Protection: Joint sealers.
   2. Section 08 71 00 - Door Hardware: Hardware.
   3. Section 08 80 00 - Glazing.
   4. Section 09 90 00 – Painting: Field painting of frames.

1.2 REFERENCES

A. American National Standards Institute:
   1. ANSI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.

B. ASTM International:
   1. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. National Fire Protection Association:
   1. NFPA 80 - Standard for Fire Doors, Fire Windows.
   2. NFPA 105 - Standard for the Installation of Smoke Door Assemblies and other Opening Protectives.
   3. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.

D. Underwriters Laboratories Inc.:
   1. UL 10B - Fire Tests of Door Assemblies.
   2. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
   3. UL 1784 - Air Leakage Tests of Door Assemblies.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate frame elevations, reinforcement, anchor types and spacing, location of cut-outs for hardware, and finish.

C. Product Data: Submit frame configuration and finishes.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Conform to requirements of ANSI A250.8.

B. Fire Rated Frame Construction: Conform to one of the following:

1. NFPA 252; with neutral pressure level at 40 inches maximum above sill at 5 minutes into test.
2. UL 10C.

C. Installed Fire Rated Frame Assembly: Conform to NFPA 80 for fire rated class same as fire door.

D. Attach label from agency approved by authority having jurisdiction to identify each fire rated door frame.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Accept frames on site in manufacturer's packaging. Inspect for damage.

C. Break seal on-site to permit ventilation.

1.7 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate Work with frame opening construction, door, and hardware installation.

C. Sequence installation to accommodate required door hardware electric wire connections.

PART 2 PRODUCTS

2.1 STANDARD STEEL FRAMES

A. Manufacturers:
1. Amweld Building Products, Inc.
2. Ceco Door Products
3. [unbarton Corp.
4. Kewanee Corp.
5. Republic Builders Products
6. Steelcraft
7. Or equal

B. Product Description: Standard shop fabricated steel frames, fire rated and non-rated types.
1. Interior Frames:
a. 16 gage/0.053 inch thick material, base metal thickness.

2.2 ACCESSORIES

A. Removable Stops: Rolled steel channel shape, butted corners; prepared for countersink style screws.

B. Bituminous Coating: Non-asbestos fibered asphalt emulsion.

C. Primer: ANSI A250.10 rust inhibitive type.

D. Silencers: Resilient rubber fitted into drilled hole.

E. Weatherstripping: Specified in Section 08 71 00.

2.3 FABRICATION

A. Fabricate frames for knock down field assembly for gypsum board slip on type.

B. Transom Bars for Glazed Lights: Fixed type, of same profiles as jamb and head.

C. Fabricate frames with hardware reinforcement plates welded in place.

D. Reinforce frames wider than 48 inches with roll formed steel channels fitted tightly into frame head, flush with top.

E. Prepare frames for silencers. Provide three single silencers for single doors on strike side.

F. Attach fire rated label to each fire rated frame.

2.4 SHOP FINISHING

A. Steel Sheet: Galvanized to ASTM A653/A653M G60.

B. Primer: Baked.

C. Coat inside of frame profile with bituminous coating to minimum thickness of 1/16 inch.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify opening sizes and tolerances are acceptable.

3.2 INSTALLATION

A. Install frames in accordance with ANSI A250.8.

B. Coordinate with gypsum board wall construction for anchor placement.

C. Coordinate installation of glass and glazing specified in Section 08 80 00.

D. Coordinate installation of frames with installation of hardware specified in Section 08 71 00 and doors in Section 08 14 16.

3.3 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Diagonal Distortion: 1/16 inch measured with straight edges, crossed corner to corner.

END OF SECTION

SECTION 08 14 16

FLUSH WOOD DOORS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Flush wood doors.
2. Door glazing.

B. Related Requirements:
1. Section 08 12 14 - Standard Steel Frames.
2. Section 0834 61 – Bullet Resistant Wood Door and Frame Assembly.
3. Section 08 71 00 - Door Hardware.
4. Section 08 80 00 - Glazing.

1.2 REFERENCE STANDARDS

A. Architectural Woodwork Institute:
1. AWI AWS - Architectural Woodwork Standards.

B. California Department of Health Services:
1. CA/DHS/EHLB/R-174 - Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers, including 2004 Addenda.

C. Hardwood Plywood and Veneer Association:
1. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood.

D. National Fire Protection Association:
1. NFPA 80 - Standard for Fire Doors, Fire Windows.
2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.

E. Underwriters Laboratories Inc.:
1. UL 10C - Positive Pressure Fire Tests of Door Assemblies.

F. Wood Window and Door Manufacturers Association:
1. WDMA I.S 1A - Architectural Wood Flush Doors.

1.3 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate Work with door opening construction, door frame and door hardware installation.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data:
1. Submit data for door core materials and construction.

2. Submit data for veneer species, type and characteristics.
3. Submit data for factory finishes.

C. Shop Drawings:
1. Indicate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, and factory machining criteria.
2. Indicate cutouts for glazing.

D. Samples:
1. Submit samples of door veneer, illustrating wood grain, stain color, and sheen.

E. Manufacturers' Instructions: Submit special installation instructions.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with AWI AWS Section 9, Premium Grade.

B. Finish doors in accordance with AWI AWS Section 5 Premium Grade.

C. Fire Rated Door Construction: Conform to one of the following:
1. NFPA 252; with neutral pressure level at 40 inches maximum above sill at 5 minutes into test.
2. UL 10C.

D. Fire Rated Stair Doors: Rate of rise of 450 degrees F across door thickness.

E. Installed Fire Rated Door Assembly: Conform to NFPA 80 for fire rated class as indicated on Drawings.

F. Attach label from agency approved by authority having jurisdiction to identify each fire rated door.
1. Indicate temperature rise rating for stair doors.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Package, deliver and store doors in accordance with AWI AWS Section 2.

C. Accept doors on site in manufacturer's packaging. Inspect for damage.
1. Break seal on site to permit ventilation.

1.8 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

C. Interior Doors:
   1. Factory Finished Doors: Furnish manufacturer's life of installation warranty.

PART 2 PRODUCTS

2.1 FLUSH WOOD DOORS

A. Manufacturer List:
   1. Algoma Hardwoods Inc.
   2. Eggers Industries.
   3. Graham Manufacturing Corp.
   4. Marshfield Door Systems
   5. Mohawk Flush Doors, Inc.
   6. Oshkosh Architectural Door Company
   7. Or equal

B. Flush Interior Doors: Solid core.
   1. Thickness: 1-3/4 inches
   2. Core: PC and FD.
   3. Face Construction: Five ply.
   4. Performance Duty Level: Heavy duty.

C. Performance / Design Criteria:
   1. Performance Duty Level: WDMA I.S. 1A.
   2. Fire Resistance: As indicated on Drawings.

2.2 MATERIALS

A. Door Cores: AWI AWS Section 9.
   1. Solid Core, Non-Fire Rated:
      a. Type: PC; particleboard.
   2. Solid Core, Fire Rated: Category A for positive pressure fire test.
      a. Type FD; fire resistive composite.

B. Interior Door Faces:
   1. Transparent Finished Faces: Wood veneer.
      a. Species: Red oak.
      b. Veneer Cut: Plain sliced.
      c. Veneer Matching: Book matched.
      d. Face Matching: Running. Pair match multiple door leaves in single opening.

C. Facing Adhesive: Type I - waterproof.

2.3 FABRICATION

A. Fabricate doors in accordance with AWI AWS Section 9 requirements.

B. Furnish closer and lock blocks at lock edge and top of door for closer for hardware reinforcement.

C. Vertical Exposed Edge of Stiles: Wood veneer matching door facing.

D. Fit door edge trim to edge of stiles after applying veneer facing.

E. Bond edge banding to cores.

F. Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware. Furnish solid blocking for through bolted hardware.

G. Factory fit doors for frame opening dimensions identified on shop drawings.

H. Cut and configure exterior door edge to receive recessed weather stripping devices.

I. Provide edge clearances in accordance with AWI AWS Section 9.

2.4 FINISHES

A. Transparent Finish System: Stained, color and sheen as selected.
   1. System 9; UV curable epoxy, polyester, urethane.

B. Seal door top edge with color sealer to match door facing.

2.5 ACCESSORIES

A. Door Glazing:
   1. Glass: As specified in Section 08 80 00.
   2. Glazing Stops: Wood, of same species as door facing.
   3. Glazing Stops: Wood with metal clips for rated doors.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 INSTALLATION

A. Install doors in accordance with AWI AWS Section 9 and manufacturer's instructions.

B. Coordinate installation of doors with installation of frames specified in Section 08 12 14 and hardware specified in Section 08 71 00.

C. Coordinate installation of glass and glazing specified in Section 08 80 00.

3.3 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taut string, corner to corner, over imaginary 36 x 84 inches surface area.

C. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taut string, top to bottom, over imaginary 36 x 84 inches surface area.

D. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to edge, over imaginary 36 x 84 inches surface area.

3.4 ADJUSTING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for starting and adjusting.

B. Adjust door for smooth and balanced door movement.

C. Adjust door closer for full closure.

END OF SECTION

SECTION 08 17 43

FRP DOORS AND ALUMINUM FRAMING SYSTEM

PART 1 GENERAL

1.1 SUMMARY

A. Section includes FRP flush doors and aluminum frames with insulated FRP panels. Doors and frames shall be fitted with factory applied weatherstripping as specified herein.

A. Related Sections:
1. Section 08 71 00 – Door Hardware.
2. Section 08 80 00 – Glazing.

1.2 REFERENCES

A. AAMA:
1. AAMA 1503 – Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.

B. ASTM International:
1. ASTM D256 – Standard Test Method for Determining the Izod Pendulum Impact Resistance of Plastics.
2. ASTM D570 – Standard Test Method for Water Absorption of Plastics.
3. ASTM D2583 – Standard Test Method of Indention Hardness of Rigid Plastics by Means of Barcol Impressor.
4. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.

1.3 DESIGN REQUIREMENTS

A. Provide door assemblies that have been designed and fabricated to comply with requirements for system performance characteristics listed below, as demonstrated by testing manufacturer's corresponding standard systems according to test methods designated.

1.4 PERFORMANCE REQUIREMENTS

A. Thermal Transmission (exterior doors): "U" value of not more than 0.09 (BTH/Hr. x sf x degrees F.) per AAMA 1503.01.SUBMITTALS

B. Flame Spread / Smoke Developed: Provide FRP doors and panels with the following ratings in according with ASTM E 84:
1. Flame Spread: Not greater than 170 (Class C).
2. Smoke Developed: Not greater than 390 (Class C).

C. Class A option for flame spread and smoke developed rating on interior faces of exterior panels and both faces of interior panel as shown. Flame spread no greater than 15, smoke developed no greater than 310 per ASTM E-84.

D. Additional Criteria: Provide FRP doors and panels with the following performance:
1. ASTM D 256 - nominal value of 20.0
2. ASTM D 570 - nominal value of .20 to 40

3. ASTM D 2583 - nominal value of 50

E. Abrasion Resistance: Face sheet to have no greater than .029 average weight loss percentage after Taber Abrasion Test - 25 cycles at 500 gram weight with H-18 wheel.

F. Stain Resistance: Face sheet to be unaffected after 24 hour exposure to SVS-1 white spray enamel. Must retain DE of .57 of less with MacBeth Colorimeter. Dark Brown (bronze) FRP to be used as a basis.

G. Chemical Resistance: Face sheet to be unaffected after 4 hour exposure to acetic acid (10% solution), acetone, sodium hypochlorite (5.25% solution) and hydrochloric acid (10% solution). No discoloration or panel damage will be allowed.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings: Indicate door and frame elevations, reinforcement, anchor types and spacings, location of cut-outs for hardware, and finish.

C. Product Data: Submit manufacturer's product data, specifications and instructions for each type of door and frame required in accordance with the following:
1. Include details of core, stile and rail construction, trim for lites and all other components.
2. Include details of finish hardware mounting.

D. Samples:
1. Submit samples of FRP door facing for selection of color and texture.
2. Submit samples of each aluminum alloy to be used on this project. Where normal finish color and texture variations are expected, include two or more samples to show the range of such variations.

E. Manufacturer's Installation Instructions: Indicate special installation instructions.

F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

A. Standards: Comply with the requirements and recommendations in applicable specification and standards by AAMA, except to the extent more stringent requirements are indicated.

B. Instruction: Manufacturer or manufacturer's representative will be available for consultation to all parties engaged in the project including instruction to installation personnel.

C. Field Measurement: Field verify all information prior to fabrication and furnishing of materials. Furnish and install materials omitted due to lack of verification at no additional cost to Owner.

D. Regulation and Codes: comply with the current edition in force at the project location of all local, state and federal codes and regulations, including the Americans with Disabilities Act.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Supplier/Installer shall be factory direct authorized distributors of the specified product. Installers shall be as approved by the manufacturer with minimum 3 years documented experience with projects of similar size and scope.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Accept frames on site in manufacturer's packaging. Inspect for damage.

1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate the work with frame opening construction, door, and hardware installation.

PART 2 PRODUCTS

2.1 FRP DOORS AND ALUMINUM FRAMING

A. Manufacturers
1. Commercial Door Systems
2. Special-Lite, Inc.
3. Kawneer
4. Substitutions: Not Permitted.

2.2 MATERIALS

A. Aluminum Members: Alloy and temper as recommended by manufacturer for strength, corrosion resistance and application of required finish and control of color; ASTM B 221 for extrusions, ASTM B 209 for sheet/plate with aluminum wall thickness of 0.125".

2.3 ACCESSORIES

A. Fasteners: Aluminum, non-magnetic stainless steel or other non-corrosive metal fasteners, guaranteed by the manufacturer to be compatible with the doors, frames, stops, panels, hardware, anchors and other items being fastened. For exposed fasteners (if any) provide Phillips head screws with finish matching the item to be fastened.

2.4 FABRICATION

A. Sizes and Profiles: The required sizes for door and frame units, and profile requirements are shown on the drawings.

B. Sizes and Profiles: The required sizes for door and frame units, and profile requirements are shown on the drawings.

C. Complete the cutting, fitting, forming, drilling and grinding of all metal work prior to assembly. Remove burrs from cut edges, and ease edges and corners to a radius of approximately 1/64".

D. Maintain continuity of line and accurate relation of planes and angles. Secure attachments and support at mechanical joints, with hairline fit at contacting members.

2.5 FIBERGLASS REINFORCED POLYESTER FRP FLUSH DOORS

A. Materials and Construction:
1. Construct 1-3/4" thickness doors of 6063-T5 aluminum alloy stiles and rails minimum 2-5/16" depth. Construct with mitered corners and provide joinery of 3/8" diameter full width tie rods through extruded splines top and bottom as standard. 125" tubular shaped stiles and rails reinforced to accept hardware as specified. Provide hex type aircraft nuts for joinery without welds, glues or other methods for securing internal door extrusions. Furnish integral reglets to accept face sheet to permit a flush appearance. Rail caps or other face sheet capture methods are not acceptable.
2. Extrude top and bottom railings for interlocking continuous rigidity weather bar. Lock face sheet material in place with extruded interlocking edges to be flush with aluminum stiles and rails.
3. Door face sheets: .120" thickness fiberglass reinforced polyester. SL-17 doors with an abuse resistance engineered surface of the standard colors as selected by the Architect.
4. Core of Door Assembly: Minimum 5 lbs/cu.ft. density poured in place polyurethane free of CFC. Minimum “R” value of 11. Ballistic rating is as indicated. Meeting stiles on pairs of doors and bottom weather bar with nylon brush weatherstripping.
5. Manufacture doors with cutouts for vision lites, louvers or panels as scheduled. Factory furnish and install all glass, louvers and panels prior to shipment.
6. Pre-machine doors in accordance with templates from the specified hardware manufacturers and approved hardware schedule. Factory install hardware.

2.6 ALUMINUM FRAMING SYSTEM

A. Tubular Framing: Framing system from the door manufacturer of the size and type shown. .125" minimum wall thickness and type 6063-T5 aluminum alloy. .625" high applied door stops with screws and weatherstripping. Frame members are to be box type with four (4) enclosed sides. Open back farming will not be acceptable.

B. Caulk joints before assembling frame members. Secure joints with fasteners and provide a hairline butt joint appearance. Prefit doors to frame assembly at factory prior to shipment. Field fabrication of framing using “stick” material is not acceptable

C. Applied stops for side, transom and borrowed lites and panels, with fasteners exposed on interior or unsecure portion only. Pre-machine and reinforce frame members for hardware in accordance with manufacturer’s standards and the approved hardware schedule. Factory install hardware.

D. Factory preassemble side lites to the greatest extent possible, and mark frame assemblies according to location..

2.7 FINISHES

A. Anodized Surfaces: color as selected from Manufacturers standard colors.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.2 INSTALLATION

A. Comply with manufacturer's recommendations and specifications for the installation of the doors and frames. Factory install hardware, glass and louvers in doors. Factory assemble side lites and transoms to the greatest extent possible.

B. Set units plumb, level and true to line, without warp or rack of doors or frames. Anchor securely in place. Separate aluminum and other metal surfaces with bituminous coatings.

C. Set thresholds in a bed of mastic and backseal.

D. Clean surface promptly after installation of doors and frames, exercising care to avoid damage to the protective coatings.

E. Ensure that the doors and frames will be without damage or deterioration (other than normal weathering) at the time of acceptance.

F. Provide owner with all adjustment tools and instruction sheets. Arrange an inservice session to Owner at Owner's convenience. Provide a minimum one year on all labor related to this section. Any workmanship which is defective or deficient shall be corrected to the Owner's satisfaction and at no additional cost to the Owner.

3.3 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Diagonal Distortion: 1/16 inch measured with straight edges, crossed corner to corner.

3.4 ADJUSTING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for starting and adjusting.

B. Adjust door for smooth and balanced door movement.

C. Adjust door closer for full closure.

END OF SECTION

SECTION 08 34 61

BULLET RESISTANT WOOD DOOR & FRAME ASSEMBLY

PART 1 GENERAL

1.1 SUMMARY

A. Section includes bullet resistant wood door and frame assembly.

B. Related Sections:
1. Section 08 71 00 – Door Hardware.
2. Section 09 90 00 – Field finishing of door and frame.

1.2 REFERENCES

A. AWS D1.3-89: Structural Welding Code – Sheet Steel

B. Underwriters Laboratory
1. UL 752 Bullet Resisting Equipment

1.3 DESIGN REQUIREMENTS

A. Door and frame shall designed and manufactured to be of the "non-ricochet type". This design is intended to permit the capture and retention of an attacking projectile lessening the potential of a random injury or lateral penetration.

B. The ballistic capturing barrier shall be UL LISTED Bullet Resistant Composite manufactured by Armortex or equal.

1.4 PERFORMANCE REQUIREMENTS

A. Protection level shall be UL Level 2.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Submit shop drawings indicating frame profiles, size, type and spacing of frame anchors, reinforcement size and locations, details of joints and connections, welding details and printed data in sufficient detail to indicate compliance with the contract documents.

C. Product Data: Submit catalog cuts, and manufacturers specifications.

D. Provide proof of possession of PRODUCT LIABILITY INSURANCE in an amount not less than five million U.S. dollars.

E. Submit manufacturer’s instructions for installation of the door.

1.6 QUALITY ASSURANCE

A. The door and frame must be manufactured by the same firm.

B. Units must be manufactured in strict accordance with specifications, design and details.

C. All welds shall be in accordance with the requirements and standard practices of the American Welding Society.

1.7 QUALIFICATIONS

A. The provider of this door must be ISO 9001:2008 Certified by an accredited registrar and provide proof of such.

1.8 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.9 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Requirements for coordination.

B. Coordinate work with Section 08 71 00.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. The door and frame to be model, size, etc. as indicated on the contract drawings; manufactured by Armortex, Schertz, Texas. Phone: (210) 661-8306, (800) 880-8306, Fax: (210) 661-8308. If in compliance with all aspects of this specification products by these additional manufacturers may be acceptable:

B. Manufacturers:
1. Eggers Industries
2. Algoma Hardwoods
3. Diebold, Inc.

2.2 DOOR CONSTRUCTION

A. Bullet resistant solid core wood door shall be of the "non-ricochet type" complete with unfinished face veneer.

B. Door unit shall be supplied pre hung with a Continuous Gear Hinge on a steel frame.

C. All stiles and rail edges shall be solid wood of the veneer species, a minimum of 3/8” thick.

2.3 DOOR FACING

A. Veneer Facing: AWI Premium Grade plain sliced red oak with book matched grain, for transparent finish.

2.4 FRAME

A. Frames shall be a protection level equal to the door.

B. Frame shall be of a "non-ricochet type" design, constructed of 16 ga. commercial grade steel lined with UL LISTED Bullet Resistant Composite.

C. Steel shall be free of scale, pitting, coil breaks or other surface defects.

D. Finish work shall be neat and free of defects.

E. Frames shall be welded. Knocked down and mechanical joints are unacceptable.

2.5 FABRICATION

A. Door and frame shall be mortised at the factory for template hardware in accordance with the approved hardware schedule. Templates are to be provided to the door manufacturer by the hardware contractor.

B. All exposed welds shall be ground flush and finished smooth.

2.6 FINISHING

A. Door: Transparent field finish to match doors specified in Section 08 14 16.

B. Frame: Baked primer.

2.7 FABRICATION TOLERANCES

A. Standard manufacturing tolerances shall be +/- 1/16" for frame opening width, height, diagonal dimensions and overall width and height (outside to outside).

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.2 INSTALLATION

A. The installation of the door and frame shall be in accordance with manufacturer’s instructions.

B. Where surface mounted hardware is to be applied, all drilling and taping shall be performed at the jobsite by the installing contractor.

C. Where field mounted hardware is to be attached to the wood surface all anchors must be through bolted.

D. No field alterations to the construction of the units fabricated under the acceptable standards shall be allowed unless approved by the manufacturer and the architect.

3.3 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Diagonal Distortion: 1/16 inch measured with straight edges, crossed corner to corner.

3.4 ADJUSTING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for starting and adjusting.

B. Adjust door for smooth and balanced door movement.

C. Adjust door closer for full closure.

END OF SECTION

SECTION 08 52 00

WOOD WINDOWS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Plastic clad wood windows.
2. Factory glazing.
3. Operating hardware.
4. Insect screens.

B. Related Requirements:
1. Section 06 10 00 - Rough Carpentry: Framed openings.
2. Section 07 90 00 - Joint Protection: Perimeter sealant and back-up materials.
3. Section 09 90 00 - Painting and Coating: Site finishing wood surfaces.

1.2 REFERENCE STANDARDS

A. American Architectural Manufacturers Association:
1. AAMA 101 - Voluntary Performance Specification for Windows, Skylights and Glass Doors.

B. ASTM International:
1. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

C. Glass Association of North America:
1. GANA - FGMA Sealant Manual.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit component dimensions, anchorage and fasteners, glass, internal drainage details and for window hardware and accessories.

C. Shop Drawings: Indicate opening dimensions, framed opening tolerances, affected related work; and installation requirements.

D. Samples:
1. Submit cladding and hardware color samples for selection.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

F. Manufacturer's Instructions: Submit special procedures and perimeter conditions requiring special attention.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with the following:

1. Plastic Clad Wood Windows: Fabricate and label window assemblies in accordance with AAMA 101 for types of windows required.
2. Insulated Glass: Fabricate insulated glass units in accordance with GANA.

B. Surface Burning Characteristics:
1. Foam Insulation: Maximum 75/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing wood windows with minimum three years documented experience.

B. Installer: Company specializing in performing installation of wood windows with minimum three years documented experience and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Protect factory finished surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond when exposed to sunlight or weather.

1.7 AMBIENT CONDITIONS

A. Section 01 50 00 - Temporary Facilities and Controls: Ambient conditions control facilities for product storage and installation.

B. Do not install sealants when ambient temperature is less than 40 degrees F.

C. Maintain this minimum temperature during and after installation of sealants.

1.8 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for warranties.

B. Furnish five year manufacturer's warranty for insulated glass units from seal failure, interpane dusting or misting, and replacement of same.

C. Warranty:
1. Include coverage for degradation of color finish.
2. Include coverage for delamination or separation of finish cladding from window member.

PART 2 PRODUCTS

2.1 WOOD WINDOWS

A. Manufacturer and Product List:
1. Andersen Commercial; 400 series as basis of design.
2. Marvin Windows & Doors.
3. Pella Corp.

B. Product Description: Commercial quality wood windows, site finished plastic clad finish, sash, glass and glazing, operating hardware, and insect screen for operable windows.

C. Window Configuration: Fixed, non-operable sash.

D. Performance / Design Criteria:
   1. Primary Performance Requirements: AAMA 101 Designation LC-PG50 or better.

2.2 COMPONENTS

A. Wood: Clear Pine species, clear preservative treated, of type suitable for transparent interior finish.

B. Plastic Cladding (Exterior Surface): Extruded PVC, low sheen surface, factory fit to profile of exterior exposed surfaces; ASTM D1785 PVC, minimum 35 mils thick, with integral surface applied ultra-violet degradation resistance; welded corners.

C. Frames: Seamless one piece, preformed rigid vinyl frame covered secured to the exterior of the frame with nailing flange. Clear pine interior stops.

D. Glazing: High-Performance Low E.

E. Weather-stripping: Flexible bulb or black PVC closed cell foam.

F. Screen: Perma-Clean insect screen.

G. Hardware: Andersen Classic Collection with compact operator handle.

H. Interior Trim: Window distributor shall provide jamb extension members at interior window frame perimeter to close off shim space between new window and wall construction. Installation of interior trim by others.

2.3 SEALANT MATERIALS

A. Sealant and Backing Materials: As specified in Section 07900.

2.4 FINISH

A. Rigid vinyl PVC cladding - color as selected by Architect.

B. Interior finish. Job site finish. Finish all exposed unfinished wood. Refer to Section 09900.

C. Exposed Hardware: Baked enamel color as selected.

2.5 ACCESSORIES

A. Anchors: Hot dip galvanized steel.

B. Visual Glass Dividers: Solid wood, fitted against interior of glazed surface, secured with spring loaded steel pins into plastic sockets.

C. Visual Glass Muntins: Formed plastic, applied to exterior glass surface.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify wall openings and adjoining air and vapor seal materials are ready to receive work of this section, and opening dimensions and clearances are as indicated on shop drawings.

3.2 INSTALLATION

A. Install windows in accordance with manufacturer's recommendations and approved shop drawings to achieve weathertight and freely operating installation.

B. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.

C. Secure assembly to framed openings, plumb and square, without distortion.

D. Place insulation in shim spaces around unit perimeter to maintain continuity of building thermal barrier.

E. Install sealant and related backing materials at perimeter of assembly. Refer to Section 07900.

F. Install sills, stools, and aprons.

G. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

H. Coordinate attachment and seal of perimeter air and vapor retarder materials.

I. Install operating hardware.

3.3 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Variation from Level and from Plumb: 1/16 inches every 3 ft non-cumulative or 1/8 inches per 10 ft, whichever is less.

3.4 ADJUSTING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for starting and adjusting.

B. Adjust hardware for smooth operation and secure weathertight closure.

3.5 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.

B. Remove protective material from factory finished surfaces.

C. Remove labels and visible markings.

D. Wash surfaces by method recommended and acceptable to sealant and window manufacturer; rinse and wipe surfaces clean.

END OF SECTION

SECTION 08 56 13

BULLET RESISTANT TRANSACTION WINDOWS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Bullet resistant transaction window.
2. Hollow metal frame with bullet resistant composite.
3. Transaction tray.
4. Plastic laminate shelf.

B. Related Sections:
1. Section 07 90 00 – Joint Protection: Sealants for perimeter.
2. Section 09 90 00 – Painting: Field painting of frame.

1.2 REFERENCES

A. Underwriters Laboratory:
1. UL 752 – Standard for Bullet Resistant Equipment.

1.3 DESIGN REQUIREMENTS

A. Frame shall be designed and manufactured to be of the "non-ricochet type". This design is intended to permit the capture and retention of an attacking projectile lessening the potential of a random injury or lateral penetration.

B. The capturing barrier shall be UL Listed Bullet Resistant Composite manufactured by Armortex or equal.

1.4 PERFORMANCE REQUIREMENTS

A. Protection level shall be UL level 1.

B. Frames shall be of a protection level equal to or greater than the glazing.

1.5 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Shop Drawings: Indicate frame profiles, size, type and spacing of frame anchors, reinforcement size and locations, details of joints and connections, welding details and printed data in sufficient detail to indicate compliance with the contract documents.

C. Product Data: Submit catalog cuts and manufacturers specifications.

D. Samples: Submit plastic laminate samples for selection.

E. Provide proof of possession of Product Liability Insurance in an amount not less than five million U.S. dollars.

F. Manufacturer's Installation Instructions.

1.6 QUALITY ASSURANCE

A. Units must be manufactured in strict accordance with the specifications, design and details.

B. All welds shall be in accordance with the requirements and standard practices of the American Welding Society.

1.7 QUALIFICATIONS

A. The provider of this window must be ISO 9001:2008 Certified by an accredited registrar and provide proof of such.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Accept products on site. Inspect for damage.

1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Bullet Resistant Frames and glazing assemblies shall be manufactured by Armortex of Schertz, Texas. Phone: 210-661-8306, 800-880-8306, Fax: 210-661-8308. If in compliance with all aspects of this specification, products by these additional manufacturers may be acceptable:

B. Manufacturers:
1. Diebold, Inc..
2. Ross Engineering.
3. Norshield Security Products

2.2 FRAMES

A. Three sided hollow metal "natural voice" frame modules shall be of a "non-ricochet type" design, constructed of brake formed commercial grade cold rolled 16 ga. steel lined with UL Listed Bullet Resistant Composite.

B. Steel shall be free of scale, pitting, coil breaks and finish work shall be neat and free of defects.

C. Corners shall be continuously welded the full length of the intersection. Knocked down and mechanical joints are unacceptable.

D. Frame modules shall be capable of being joined with other frame modules to form a continuous hard line.

E. Replacement of glazing shall be from the secure side of the window or wall unit and will not require the removal of the frame from the opening.

2.3 SHELF

A. Provide a shelf not less than 2" thick with a recessed dip tray.

B. The shelf to be full width of window and a minimum of 12" deep centered under the glazing covered with a decorative high pressure laminate, color as selected.

2.4 DIP TRAY

A. Constructed of 16 ga. stainless steel, # 3 finish 10" x 16" from the outside edge of flanges with a clear open depth under the glazing of 1 5/8".

2.5 GLAZING

A. The glazing must be UL Listed polycarbonate of safety level specified.

B. The bottom edge of the glazing panel shall have a stainless steel cap of 20 ga. with a #3 brushed finish.

2.6 FABRICATION

A. All exposed welds shall be ground flush and finished smooth.

2.7 FINISH

A. Frame: Baked primer.

2.8 FABRICATION TOLERANCES

A. Standard manufacturing tolerances shall be +/- 1/16" for frame opening, diagonal dimensions of frame, overall frame width, height, depth, etc .

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

3.2 INSTALLATION

A. Set frames and glaze in accordance with manufacturer's instructions. Repair damaged units (if approved by the manufacturer and the architect) or replace with new units.

B. No field alterations to the construction of the units fabricated under the acceptable standards shall be allowed unless approved by the manufacturer and the architect.

3.3 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Diagonal Distrotion: 1/16 inch measured with straight edges, crossed corner to corner.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:
1. Furnish hardware required to complete the work as shown on the drawings and as specified herein;
2. Furnish trim attachments and fastenings, specified or otherwise required, for proper and complete installation.
3. Deliver to the job site those items of finish hardware scheduled to be installed at the job site; and delivered to other points of installation those items of finish hardware scheduled to be factory installed, including:
   a. Butt Hinges
   b. Continuous Hinges
   c. Lock cylinders and keys
   d. Lock and latch sets
   e. Push/pull units
   f. Closers
   g. Overhead holders
   h. Miscellaneous door control devices
   i. Door trim units
   j. Protection plates
   k. Weather-stripping (except where provided with aluminum entrance doors)
   l. Thresholds
   m. Wall or floor stops

B. Related Sections:
1. Section 08 12 14 - Standard Steel Frames: Silencers integral with steel frames.
2. Section 08 14 16 - Flush Wood Doors.
3. Section 08 17 43 - FRP Doors and Aluminum Framing System.
4. Section 08 34 61 – Bullet Resistant Wood Door and Frame Assembly.
5. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Power supply to electric hardware devices.
6. Section 28 31 00 - Fire Detection and Alarm: Electrical connection to release electric strikes.

1.2 REFERENCES

A. American National Standards Institute:
1. ANSI A156.1 - Butts and Hinges.
2. ANSI A156.2 - Bored and Preassembled Locks and Latches.
3. ANSI A156.3 - Exit Devices.
4. ANSI A156.4 - Door Controls - Closures.
5. ANSI A156.5 - Auxiliary Locks and Associated Products.
6. ANSI A156.6 - Architectural Door Trim.
7. ANSI A156.7 - Template Hinge Dimensions.
8. ANSI A156.8 - Door Controls - Overhead Holders.
9. ANSI A156.12 - Interconnected Locks and Latches.
10. ANSI A156.13 - Mortise Locks and Latches.
11. ANSI A156.14 - Sliding and Folding Door Hardware.

12. ANSI A156.15 - Closer Holder Release Devices.
13. ANSI A156.16 - Auxiliary Hardware.
14. ANSI A156.18 - Materials and Finishes
15. ANSI A156.19 - Power Assist and Low Energy Power Operated Doors.
16. ANSI A156.23 - Electromagnetic Locks.
17. ANSI A156.24 - Delayed Egress Locks.
18. ANSI A156 - Complete Set of 24 BHMA Standards (A156 Series) with Binder.

B. Builders Hardware Manufacturers Association:
   1. BHMA Directory of Certified Products.

C. National Fire Protection Association:
   1. NFPA 80 - Standard for Fire Doors, Fire Windows.
   2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.

D. Underwriters Laboratories Inc.:
   1. UL 10B - Fire Tests of Door Assemblies.
   2. UL 305 - Panic Hardware.
   3. UL - Building Materials Directory.

E. Intertek Testing Services (Warnock Hersey Listed):
   1. WH - Certification Listings.

1.3 DEFINITIONS

A. "Finish Hardware": Items required for swinging, sliding and folding doors, except special types of unique and non-matching hardware specified under door and frame Sections of these Specifications.

1.4 DESIGN REQUIREMENTS

A. Thoroughly review finish hardware schedule, comparing it with the floor plan, door schedule, and door details to verify hardware requirements, quantities, door swings, finishes, and sizes.

B. If an inconsistency or error in the proposed construction documents is suspected, the hardware supplier is to bring it immediately to the attention of the Architect. If the quantity of items is questioned, for bidding purposes, assume the higher quantity is required and price accordingly.

C. Architect's review of Submittals is for design concept only, and does not relieve the Contractor of the responsibility to furnish sufficient material and functions required for a complete, and code-worthy installation. Determination of all quantities is the responsibility of the Contractor.

1.5 PERFORMANCE REQUIREMENTS

A. Furnish finish hardware complying with the requirements of laws, codes, ordinances and guidelines of governmental authorities having jurisdiction:

B. NFPA 101, "Life Safety Code", 2000 edition.

C. NFPA 80, "Installation of Fire Doors and Windows", 1999 edition

D. International Building Code - 2009 Edition

E. ANSI A117.1-2003 Accessible and Usable Buildings and Facilities

F. Fire Rated Openings: Provide door hardware listed by UL or Intertek Testing Services (Warnock Hersey Listed), or other testing laboratory approved by applicable authorities.
   1. Hardware: Tested in accordance with NFPA 252.

1.6 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product data:
   1. Initial submittal of the proposed "Finish Hardware Schedule" in the following format:
      a. Vertically-typed, double-spaced;
      b. Organized into "hardware sets", indicating complete designations of every item required for each door or opening. Include the following information for each item of finish hardware:
         1) Manufacturer
         2) Type
         3) Style
         4) Function
         5) Size
         6) Degree and direction of opening swing (“hand”)
         7) Finish
         8) Fasteners
         9) Location of hardware set cross-referenced to indications on floor plans, door, schedule, and frame schedule.
         10) Explanation of all abbreviations, symbols, codes, etc. contained in schedule.
         11) Mounting heights and locations for hardware.
         12) Door and frame sizes and materials.
         13) Keying information.
   2. Final Finish Hardware Schedule immediately following receipt of the Architect’s approval of the initial submittal.

C. Samples:
   1. When requested by the Architect or Owner, submit one sample of each type of exposed hardware unit, finished as required, and tagged with a full description for coordination with schedule.
   2. Samples will be returned to the supplier.
   3. Units which are acceptable and remain undamaged through submittal, review and field comparison procedures may, after final check of operation, be built into the Work, within limitations of keying coordination requirements.

D. Templates: Furnish hardware templates with final submittal of Finish Hardware Schedule.

E. Manufacturer's Installation Instructions: Submit special procedures, and perimeter conditions requiring special attention.

1.7 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Project Record Documents: Record actual locations of installed cylinders and their master key code.

C. Operation and Maintenance Data: Submit data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance. Provide complete copies of

manufacturer's catalog cuts and maintenance instructions for each item furnished under the Work of this Section.

D. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.

1.8 QUALITY ASSURANCE

A. Perform Work in accordance with the following requirements:
   1. ANSI A156 series.
   2. NFPA 80.
   3. UL 305.

B. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the requirements and the methods needed for proper performance of the work of this Section.

C. Provide the service of a qualified Architectural Hardware Specialist to:
   1. Be available for consultation with the Architect at no additional cost to the Owner during progress of construction, and:
      a. Inspect installation of all finish hardware items;
      b. Make all minor adjustments required; and
      c. Report to the Architect on completeness of the installation.
   2. The hardware consultant may be an employee of the supplier.

1.9 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Supplier qualifications:
   1. A recognized architectural finish hardware supplier with warehousing facilities within a 200 mile radius of the project site and a direct distributor of all products listed on the approved finish hardware schedule.
   2. Continuously in business of finish hardware supply for not less than 5 years.

C. Installer qualifications: Employ a competent hardware installer with at least five (5) years experience installing commercial grade hardware similar to that proposed for the Work.

D. Source limitations: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer, although several may be indicated as offering products complying with requirements.

1.10 PRE-INSTALLATION MEETINGS

A. Section 01 30 00 - Administrative Requirements: Pre-installation meeting.

B. Immediately following the Architect’s final approval of the submittals, convene a mandatory pre-installation meeting to be attended by the Architect, Contractor, Installer, Supplier, and the Architect’s hardware consultant.

C. Proposed agenda to include review of:
   1. The Contract Documents;
   2. Installation schedule;
   3. Hardware Specifications;

4. Hardware locations and opening descriptions;
5. Special installation instructions;
6. Other items of pertinence to the Work.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Package hardware items individually with necessary fasteners, instructions, and installation templates, when necessary; label and identify each package with door opening code to match hardware schedule.
   1. Include instructions, templates, and fasteners needed for installation.

C. Deliver individually packaged hardware items on a vehicle operated by a direct employee of the Hardware Supplier. Contractor shall immediately, and in the presence of the Hardware Supplier, inventory the contents of the delivery.

D. Hardware supplier: Furnish finish hardware items directly to the factory or mill for factory-installation, where required.

1.12 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate Work with other directly affected sections involving manufacture or fabrication of internal reinforcement for door hardware and recessed items.
   1. Provide templates or actual hardware as required to ensure proper preparation of doors and frames.

C. Sequence installation to accommodate required utility connections.

D. Coordinate Owner's keying requirements during course of Work.

1.13 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Warrant all finish hardware items against defects in materials and workmanship for one year.

C. Extended warranty: Extend the above warranty on certain items of finish hardware as follows:
   1. Door closers: To ten years
   2. Continuous hinges: To ten years
   3. Exit devices: To five years
   4. Locks and latch sets: To five years

D. Manufacturer agrees to promptly replace (including installation by a factory representative) defective products at no additional cost to the Owner, for the duration of the warranty period.

E. The terms of such warranties extend from the Date of Substantial Completion as that date is defined by the General Conditions.

F. Failures due to defective materials or workmanship is deemed to include, but not to be limited to:
   1. Failures in operation of any operating component;

2. Defects which contribute to unsightly appearance, potential safety hazard, or potential untimely failure of the products furnished under this Section.

1.14 MAINTENANCE MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Maintenance materials.

B. Furnish special wrenches and tools applicable for each different and for each special hardware component.

C. Furnish maintenance tools and accessories supplied by hardware component manufacturer.

1.15 EXTRA MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Furnish ten extra key lock cylinders for each master keyed group.

PART 2 PRODUCTS

2.1 GENERAL

A. Requirements for design, grade, function, finish, size, and other distinctive qualities of each finish hardware item is indicated in the Finish Hardware Schedule at the end of this Section.

B. Product designations:
1. One or more manufacturers are listed for each hardware type required. Provide the product designated or the comparable product listed under this Section.

C. ANSI/BHMA designations:
1. Used to describe hardware items, or to define quality or function. Provide products complying with these standards in addition to additional requirements of this Section.

D. Hand of door: Drawings show direction of slide, swing (“hand”) of door leafs.

E. Hardware: Use hardware manufactured to conform to published templates and, generally, prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated.

2.2 MATERIALS

A. Base metals:
1. Manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser (commercially-recognized) quality than that specified for applicable hardware units by applicable ANSI A156 series standard for each type hardware item and with ANSI A156.18 for finish designations indicated.
2. Do not furnish "optional" materials for those indicated, except as otherwise specified.

B. Fasteners:
1. Furnish Phillips flat-head screws with each hardware item, unless otherwise indicated.
2. Exposed screws: Match finish of hardware (even where noted to be "prepared for paint").

3. Use concealed fasteners for hardware units which are exposed when door is closed, except where no standard units of type specified are available with concealed fasteners.
4. Do not use thru-bolts where bolt head or nut on opposite face would be exposed.
5. Where adequate reinforcement is not feasible, thru-bolting would only be acceptable if through sleeves, or if sex-screw fasteners are used.

C. Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of finish hardware.

2.3 MANUFACTURED UNITS

A. Reference standards:

Item:	Comply with:
1. Butts and hinges:	ANSI A156.1-1988 (BHMA 101)
2. Locks and lock trim:	ANSI A156.2-1987 (BHMA 601)
3. Exit devices:	ANSI A156.3-1989, Grade 1 BHMA 701)
4. Door controls-closers:	ANSI A156.4-1986,Grade 1 BHMA 301)
5. Architectural door trim:	ANSI A156.6 (BHMA 1001)
6. Template hinge dimensions:	ANSI A156.7
7. Door controls-overhead holders:	ANSI A156.8 (BHMA 311)
8. Mortise locks and latches:	ANSI A156.13-1987, Grade 1
9. Auxiliary hardware:	ANSI A156.16-1989(BHMA 1201)

B. Hardware finishes:
1. Materials and Finishes Standard: Comply with ANSI A156.18 (BHMA 1301). Finish designations used in schedules are listed, therein.
2. Provide US32D or US26D at all finish hardware exposed to view on wood door.
3. Provide matching finishes for hardware units at each door, unless otherwise indicated. Generally Dark Bronze.
4. Match the color and texture of hardware items to manufacturer's standard finish for the latchset, lockset, or push-pull unit.
5. Provide quality of finish, including thickness of plating or coating, composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than that specified or described by referenced standards.

C. Hardware for fire-rated openings:
1. Comply with NFPA 80.
2. Tested and listed by Underwriters Laboratory (UL), or Factory Mutual (FM) for type, size and use of door, and complying with requirements of door and door frame label.
3. Provide UL or FM label on door indicating "Fire door to be equipped with fire-exit hardware".
4. Provide UL or FM label on exit device indicating "Fire Exit Hardware".

2.4 PRODUCTS

A. Hinges, butts and pivots:
1. General:
   a. ANSI A156.1 - 1988 for commercial quality.
   b. Provide only template-produced units.
   c. All hinges to be concealed bearing-type.
   d. Hinges at exterior doors shall be of non-ferrous material.
2. Screws:
   a. At metal doors and frames: Machine screws.
   b. At wood doors and frames: Phillips flat-head wood screws.

c. Finish screw heads to match surface of hinges or pivots.

3. Pins:
   a. Steel hinges: Steel
   b. Non-ferrous hinges: Stainless Steel
   c. Hinges at exterior doors: Non-removable (NRP)
   d. Hinges at out-swing corridor doors: Non-removable (NRP)
   e. Hinges at interior doors: Non-rising
4. Tips:
   a. Flat button with matching plug
   b. Finish to match leaves, except where hospital tip (HT) indicated.
5. Number of hinges: Provide number of hinges indicated but not less than 3 hinges.
6. Hinge sizing:
   a. According to hinge manufacturer's recommendation for door size and weight, unless otherwise specified.
   b. Hinges for door widths 3 feet, or less: Standard-weight (.134)
   c. Hinges for door widths over 3 feet: Heavy-weight (.180) hinges
7. Acceptable products:
   a. For interior standard weight hinges:
      1) Stanley FBB179
      2) Hager BB1279
      3) Ives 5BB1

B. Locksets: Shall be Schlage ND or AL Series by Hardware Set. Equivalent products shall be Sargent 10 Line where ND Series is shown and 7 line where AL Series are shown.

C. Lock Cylinders and Keying:
   1. General:
      a. Key new cylinders to match existing Schlage system

D. Access Control System shall be Schlage Electronics Bright Blue
   1. The Access Control System shall be furnished and installed by an Authorized Center trained by the manufacturer of the access control system supplied.
   2. The Supplier's Authorized Center office will be a fully staffed local office, within one hundred(100) miles of the Owner's site. The Authorized Center will be staffed by factory trained technicians and must be adequately equipped to provide emergency service within (24) hours
   3. The Authorized Center will provide pricing for both 1 year and 5 year service and extended warranty.
   4. The Authorized Center will provide all cable installation, identification and termination in accordance with the manufacturer's technical installation guidance, in addition to all applicable code requirements.
   5. The Authorized Center will provide the owner with a four (8) hour manufacturer's certified administrator training course available for two (2) end-user system administrators. The sessions may be scheduled at any time from the award of the contract. Each system administrator will be provided with complete operating instructions. System training will be supplemented with tutorials that provide the administrator with a basic overview of system navigation, programming and operation. Certification will be provided to system administrators upon successful completion of the training.
   6. Supports up to 32 devices and 5,000 cardholders from controller; supports smart card, proximity and magnetic stripe technologies
   7. The software shall include applications to accommodate all devices in the construction documents.
   8. The software shall be accessible from any PC on the same network as system supplied that has a web browser.

9. The Hardware shall be expandable to meet all criteria of this document.
10. The Hardware shall include all options to accommodate all devices in the construction
11. The PC/workstation computer shall be used to program all access control functions, generate reports, display selected transactions, valid and invalid entry activity, and all internal system status such as communication loss/restore, power loss, etc.
12. The system programming should be user friendly and capable of being accomplished by personnel with minimal computer experience. The software shall be of a consistent user interface that is compatible with current software techniques employed by Microsoft and other software developers, namely drop down menus, dialogue boxes, check boxes, etc.
13. The System shall provide a means for scheduled automatic backups of any or all database system files.
14. The single user system shall have the capability to communicate with the controller via LAN/WAN connections utilizing industry standard TCP/IP communication protocol.
15. All hardware shall be provided with enclosures with hinged doors and locks.
16. Communication between the controller and the Reader Interface shall be via RS-485 protocol.
17. The controller shall have flashable firmware upgrades.
18. The controller shall have 4GB (or more) of detachable memory to store the database and software.

E. Push pulls: 1” round. Pulls 10” c to c. Push Bar to be Centered on Stiles.

F. Door closers: Falcon SC70 Series or SC80 as shown in HW Sets. Equivalent Products shall be Norton 7500, Yale 4400, Sargent 351, or Ryobi D4550 where SC70 are shown and Norton 8500, Yale 3500, Sargent 1430, and Ryobi D3550 where SC80 are shown. Provide all Drop Plates, Brackets and Spacers as Required for proper mounting.

G. Overhead Stops: Shall be Glynn Johnson or equivalent by any BHMA manufacturer.

H. Kickplates and Stops: Ives or equivalent by Rockwood or Trimco. Material shall be Stainless Steel (630)

I. Weatherseals and Accoustical Seals: National Guard or Equivalent by Pemko

J. Door Bottom: Steelcraft

2.5 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

2.6 HARDWARE FINISHES

A. General:
1. Provide matching finishes for hardware units at each door or opening, to the greatest extent possible and except as otherwise indicated.
2. Reduce differences in color and textures as much as commercially possible where the base metal or metal forming process is different for individual units of hardware exposed at the same door or opening.
3. In general, match items to the manufacturer's standard finish for the latch and lock set (or push/pull units if no latch/lock sets) for color and texture.
4. Provide finishes matching those established by BHMA or, if none established, match the Architect's sample.

5. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness and other qualities complying with manufacturer's standards, but in no case less than that specified for the applicable units of hardware by referenced standards.
6. Finish designations used in schedules and elsewhere listed in ANSI A156.18 "Materials and Finishes Standard", including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.

B. Provide the following hardware finishes, unless otherwise scheduled:

1.	Hinge	US26D - Satin Chrome or US32D - Satin Stainless Steel
2.	Lock	US26D - Satin Chrome **On openings where only lock is being replaced - verify finish with owner (Existing finish is generally 605)**
3.	Cylinder	To match surrounding hardware
4.	Closer	AL - Sprayed Aluminum
5.	Push/pull bar	US32D - Satin Stainless Steel
6.	Kick/mop/armor plate	US32D - Satin Stainless Steel
7.	Wall stops	US32D - Satin Stainless Steel
8.	Overhead stops	US32D - Satin Stainless Steel
9.	Thresholds/door seals	AL - Anodized Aluminum

C. Base material: Manufacturer’s standard high-carbon steel, brass, or bronze.
1.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify doors and frames are ready to receive door hardware and dimensions are as indicated on shop drawings.

C. Verify electric power is available to power operated devices and is of correct characteristics.

D. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. General:
1. Install each item in its proper location firmly anchored into position, level and plumb, and in accordance with the manufacturer's recommendations.
2. Handing, hardware heights, locations, and degree of opening swing are indicated in the Drawings and Finish Hardware Schedule.
3. Mount finish hardware units:
   a. At recommended heights and locations as shown in approved finish hardware schedule, complying with requirements of the A.D.A., and pertinent provisions of the Building Code.
   b. To function at proper degree of opening of doors as indicated on approved finish hardware schedule.

c. By manufacturer's template.
d. Prior to final finishing of the door. Remove hardware to allow finishing of door, and permanently reinstall hardware upon completion of finishing operation.

4. Reinforce, where necessary, the substrate to assure proper attachment.
5. Drill and countersink units which are not factory-prepared for anchorage fasteners.
6. Space fasteners and anchors in accordance with industry standards.

B. Installing closers:
1. Mount closers per manufacturer's template, and secure the Architect's approval of the closer installation.
2. The Contractor will be required to REPLACE doors onto which closers are improperly mounted at no additional cost to the Owner. Repair or patching of such doors will not be acceptable.

C. Installing thresholds at exterior doors: Set in full bed of butyl-rubber, or polyisobutylene mastic sealant.

3.3 FIELD QUALITY CONTROL

A. Section [01 40 00 - Quality Requirements] [01 70 00 - Execution and Closeout Requirements]: Field inspecting, testing, adjusting, and balancing.

B. Inspection of final hardware installation: The Contractor, hardware suppliers, and Architectural Hardware Consultant (AHC) shall thoroughly check the quality of the installation and the functionality of each unit of finish hardware at all openings in the Work. The Hardware Supplier shall forward a detailed written report of all operational or installation deficiencies to the Architect and Contractor.

3.4 ADJUSTING AND CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Testing, adjusting, and balancing.

B. Check and adjust each item of hardware and each door upon completion of final installation. Verify proper function, and replace units which cannot be made to operate freely and smoothly, as intended for the application.

C. Clean adjacent surfaces soiled by hardware installation.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.

B. Do not permit adjacent work to damage hardware or hardware finish.

3.6 SCHEDULES

HW SET: 01
DOOR NUMBER:
100.1 200.2

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	ND70PD SPA	626	SCH
1	EA	SURFACE CLOSER	SC71 RW/RA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	WALL STOP	WS407CCV	630	IVE
1	SET	SEAL	9850C HEAD & JAMBS	CHA	NGP

HW SET: 02 (SEE ALT 6 FOR DELETION OF ACCESS CONTOL)
DOOR NUMBER:
102.1

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	ND80PD SPA	626	SCH
1	EA	ELECTRIC STRIKE	6211 FSE 24VDC	630	VON
1	EA	SURFACE CLOSER	SC71 SS	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	POWER SUPPLY	PS902		SCE
1	EA	BUTTON MINI BOX	660-PB		SCE
1	EA	READER INTERFACE	SBB-RI		SCE
1	EA	CARD READER	SXF1550	BLK	SCE

DOOR TO BE LOCKED FOR ENTRY. ENTRY BY PRESENTATION OF VALID CREDENTIAL WHICH WILL RELEASE ELECTRIC STRIKE AND ALLOW DOOR TO BE OPENED. DOOR CAN BE REMOTELY UNLOCKED BY USE OF PUSH BUTTON IN DISPATCH 103. EMERGENCY KEY OVERIDE. FREE EGRESS AT ALL TIMES.

HW SET: 02A (SEE ALT 6 FOR DELETION OF ACCESS CONTOL)
DOOR NUMBER:
122.1

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	ND80PD SPA	626	SCH
1	EA	ELECTRIC STRIKE	6211 FS 24VDC	630	VON
1	EA	SURFACE CLOSER	SC71 RW/RA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	POWER SUPPLY	PS902		SCE
1	EA	BUTTON MINI BOX	660-PB		SCE
1	EA	READER INTERFACE	SBB-RI		SCE
1	EA	CARD READER	SXF1550	BLK	SCE

DOOR TO BE LOCKED FOR ENTRY. ENTRY BY PRESENTATION OF VALID CREDENTIAL WHICH WILL RELEASE ELECTRIC STRIKE AND ALLOW DOOR TO BE OPENED. DOOR CAN BE REMOTELY UNLOCKED BY USE OF PUSH BUTTON IN ROOM 126. EMERGENCY KEY OVERIDE. FREE EGRESS AT ALL TIMES. ACTIVATION OF FIRE ALARM SYSTEM WILL DROP POWER TO ELECTRIC STRIKE AND ALLOW FREE ENTRY TO EXIT CORRIDOR.

HW SET: 02B (SEE ALT 6 FOR DELETION OF ACCESS CONTOL)
DOOR NUMBER:
215.1

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	ND80PD SPA	626	SCH
1	EA	ELECTRIC STRIKE	6211 FSE 24VDC	630	VON
1	EA	SURFACE CLOSER	SC71 RW/RA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	POWER SUPPLY	PS902		SCE
1	EA	BUTTON MINI BOX	660-PB		SCE
1	EA	READER INTERFACE	SBB-RI		SCE
1	EA	CARD READER	SXF1550	BLK	SCE

DOOR TO BE LOCKED FOR ENTRY. ENTRY BY PRESENTATION OF VALID CREDENTIAL WHICH WILL RELEASE ELECTRIC STRIKE AND ALLOW DOOR TO BE OPENED. DOOR CAN BE REMOTELY UNLOCKED BY USE OF PUSH BUTTON IN ROOM 216 . EMERGENCY KEY OVERIDE. FREE EGRESS AT ALL TIMES.

HW SET: 02C (SEE ALT 6 FOR DELETION OF ACCESS CONTOL)
DOOR NUMBER:
204.1

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	ND80PD SPA	626	SCH
1	EA	ELECTRIC STRIKE	6211 FSE 24VDC	630	VON
1	EA	SURFACE CLOSER	SC71 RW/RA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	POWER SUPPLY	PS902		SCE
1	EA	BUTTON MINI BOX	660-PB		SCE
1	EA	READER INTERFACE	SBB-RI		SCE
1	EA	CARD READER	SXF1550	BLK	SCE

DOOR TO BE LOCKED FOR ENTRY. ENTRY BY PRESENTATION OF VALID CREDENTIAL WHICH WILL RELEASE ELECTRIC STRIKE AND ALLOW DOOR TO BE OPENED. DOOR CAN BE REMOTELY UNLOCKED BY USE OF PUSH BUTTON IN ROOM 205. EMERGENCY KEY OVERIDE. FREE EGRESS AT ALL TIMES.

HW SET: 03
DOOR NUMBER:

103.1	124.1	126.1	206.1	207.1	208.1
209.1	210.1	213.1	216.1	218.1	

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ENTRANCE LOCK	AL53PD NEP	626	SCH
1	EA	WALL STOP	WS407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 03A
DOOR NUMBER:
205.1

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ENTRANCE LOCK	AL53PD NEP	626	SCH
1	EA	OVERHEAD STOP	450S	630	GLY
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 04
DOOR NUMBER:
104.1

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	AL70PD NEP	626	SCH
1	EA	SURFACE CLOSER	SC81 DS	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 05
DOOR NUMBER:
105.1 105.2 106.1 108.1 112.1 118.1
125.1 217.1

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PASSAGE SET	AL10S NEP	626	SCH
1	EA	WALL STOP	WS407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 06
DOOR NUMBER:
106.2

EACH TO HAVE:

		BORROWED LITE	NO HARDWARE REQUIRED

HW SET: 07 BULLET RESISTANT DOOR
DOOR NUMBER:
107.1

EACH TO HAVE:

3	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	L9080P 17A	626	SCH
1	EA	SURFACE CLOSER	SC71 RW/RA	689	FAL
1	EA	WALL STOP	WS407CCV	630	IVE
1	SET	BULLET RESISTANT	VERIFY HARDWARE WITH DOOR MANUFACTURER		

HW SET: 08
DOOR NUMBER:
108.2 109.1

EACH TO HAVE:

1	SET	REUSE HARDWARE	REUSE ALL EXISTING HARDWARE EXCEPT		
1	EA	PASSAGE SET	AL10S NEP	626	SCH

HW SET: 09
DOOR NUMBER:
110.1 127.1 128.1 129.1 130.1

EACH TO HAVE:

1	SET	REUSE HARDWARE	REUSE ALL EXISTING HARDWARE EXCEPT		
1	EA	STOREROOM LOCK	AL80PD NEP	626	SCH

HW SET: 10
DOOR NUMBER:
111.1 115.1 116.1 117.1

EACH TO HAVE:

1	SET	REUSE HARDWARE	REUSE ALL EXISTING HARDWARE EXCEPT		
1	EA	ENTRANCE LOCK	AL53PD NEP	626	SCH

HW SET: 10A
DOOR NUMBER:
114.1

EACH TO HAVE:

1	SET	REUSE HARDWARE	REUSE ALL EXISTING HARDWARE EXCEPT		
1	EA	ENTRANCE LOCK	AL53PD NEP	626	SCH
1	EA	OVERHEAD STOP	450S	630	GLY

HW SET: 11 (SEE ALT 6 FOR DELETION OF ACCESS CONTOL)
DOOR NUMBER:
113.1 212.1

EACH TO HAVE:

1	EA	CONTINUOUS HINGE	112HD	628	IVE
1	EA	PANIC DEVICE	25-R-NL X 512NL	26D	FAL
1	EA	RIM CYLINDER	20-022	626	SCH
1	EA	ELECTRIC STRIKE	6300	630	VON
1	EA	SURFACE CLOSER	SC71 SS	689	FAL
1	EA	DOOR SWEEP	C627A	CL	NGP
1	EA	THRESHOLD	425HD	AL	NGP
1	SET	WEATHERSTRIP	WEATHERSTRIP BY DOOR SUPPLIER		
1	EA	POWER SUPPLY	PS902		SCE
1	EA	READER INTERFACE	SBB-RI		SCE
1	EA	CARD READER	SXF1550	BLK	SCE

DOOR TO BE LOCKED FOR ENTRY. ENTRY BY PRESENTATION OF VALID CREDENTIAL WHICH WILL RELEASE ELECTRIC STRIKE AND ALLOW DOOR TO BE OPENED. EMERGENCY KEY OVERIDE. FREE EGRESS AT ALL TIMES.

HW SET: 11A
DOOR NUMBER:
122.2

EACH TO HAVE:

1	EA	CONTINUOUS HINGE	112HD	628	IVE
1	EA	PANIC DEVICE	25-R-NL X 512NL	26D	FAL
1	EA	RIM CYLINDER	20-022	626	SCH
1	EA	ELECTRIC STRIKE	6300	630	VON
1	EA	SURFACE CLOSER	SC71 SS	689	FAL
1	EA	DOOR SWEEP	C627A	CL	NGP
1	EA	THRESHOLD	425HD	AL	NGP
1	SET	WEATHERSTRIP	WEATHERSTRIP BY DOOR SUPPLIER		
1	EA	SINGLE DOOR INTERCOM	SINGLE DOOR INTERCOM WITH RELEASE		AIP
1	EA	POWER SUPPLY	PS902		SCE

DOOR TO BE LOCKED FOR ENTRY. INTERCOM TO BE USED FOR REMOTE RELEASE. EMERGENCY KEY OVERIDE. FREE EGRESS AT ALL TIMES.

HW SET: 12
DOOR NUMBER:
118.2 200.1

EACH TO HAVE:

1	EA	CONTINUOUS HINGE	112HD	628	IVE
1	EA	PANIC DEVICE	25-R-EO	26D	FAL
1	EA	SURFACE CLOSER	SC71 SS	689	FAL
1	EA	DOOR SWEEP	C627A	CL	NGP
1	EA	THRESHOLD	425HD	AL	NGP
1	SET	WEATHERSTRIP	WEATHERSTRIP BY DOOR SUPPLIER		

HW SET: 13
DOOR NUMBER:
119.1

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY SET	AL40S NEP	626	SCH
1	EA	SURFACE CLOSER	SC81 HD/PA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	WALL STOP	WS407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 14
DOOR NUMBER:
120.1 121.1

EACH TO HAVE:

1	SET	REUSE HARDWARE	REUSE ALL EXISTING HARDWARE EXCEPT		
1	EA	PRIVACY SET	AL40S NEP	626	SCH

HW SET: 15
DOOR NUMBER:
123.1

EACH TO HAVE:

1	SET	REUSE HARDWARE	REUSE ALL EXISTING HARDWARE EXCEPT		
1	EA	CLASSROOM LOCK	AL70PD NEP	626	SCH

HW SET: 16
DOOR NUMBER:
201.1

EACH TO HAVE:

1	EA	CONTINUOUS HINGE	112HD	628	IVE
1	EA	PANIC DEVICE	25-R-NL X 512NL	26D	FAL
1	EA	RIM CYLINDER	20-022	626	SCH
1	EA	SURFACE CLOSER	SC71 HD/PA	689	FAL
1	EA	DOOR SWEEP	C627A	CL	NGP
1	EA	THRESHOLD	425HD	AL	NGP
1	SET	WEATHERSTRIP	WEATHERSTRIP BY DOOR SUPPLIER		

HW SET: 17
DOOR NUMBER:
202.1

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	AL80PD NEP	626	SCH
1	EA	OVERHEAD STOP	450S	630	GLY
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 18
DOOR NUMBER:
203.1

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	ND70PD SPA	626	SCH
1	EA	SURFACE CLOSER	SC71 HD/PA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	WALL STOP	WS407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 18A
DOOR NUMBER:
214.1

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	ND70PD SPA	626	SCH
1	EA	SURFACE CLOSER	SC71 RW/RA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	WALL STOP	WS407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 19
DOOR NUMBER:
211.1 223.1

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY SET	AL40S NEP	626	SCH
1	EA	WALL STOP	WS407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 20 (SEE ALT 6 FOR DELETION OF ACCESS CONTOL)
DOOR NUMBER:
214.2

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	INSTITUTION LOCK	ND82PD SPA	626	SCH
1	EA	ELECTRIC STRIKE	6211 FS 24VDC	630	VON
1	EA	SURFACE CLOSER	SC71 HD/PA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
3	EA	SILENCER	SR64	GRY	IVE
1	EA	POWER SUPPLY	PS902		SCE
1	EA	BUTTON MINI BOX	660-PB		SCE
1	EA	READER INTERFACE	SBB-RI		SCE
2	EA	CARD READER	SXF1550	BLK	SCE
1	EA	TIMER	TIMER FOR ELECTRIC STRIKE		

DOOR TO REMAIN LOCKED FROM BOTH SIDES. ENTRY OR EXIT FROM COURT ROOM BY PRESENTATION OF VALID CREDENTIAL WHICH WILL RELEASE ELECTRIC STRIKE AND ALLOW DOOR TO BE OPENED. EXITING FROM COURT ROOM ALSO BY USE OF EMERGENCY PUSH BUTTON LOCATED AT JUDGES BENCH. ACTIVATION OF FIRE ALARM SYSTEM WILL RELEASE ELECTRIC STRIKE FOR EXITING. EMERGENCY KEY FOR ENTRY OR EXITING.

HW SET: 21
DOOR NUMBER:
219.1 220.1

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PUSH PLATE	8200 6" X 16"	630	IVE
1	EA	PULL PLATE	8303-8 3.5" X 15"	630	IVE
1	EA	SURFACE CLOSER	SC71 RW/RA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	WALL STOP	WS407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 22
DOOR NUMBER:
221.1

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	AL80PD NEP	626	SCH
1	EA	SURFACE CLOSER	SC81 RW/RA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	WALL STOP	WS407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 23
DOOR NUMBER:
222.1

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	CLASSROOM LOCK	AL70PD NEP	626	SCH
1	EA	WALL STOP	WS407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 24
DOOR NUMBER:
224.1

EACH TO HAVE:

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	AL80PD NEP	626	SCH
1	EA	SURFACE CLOSER	SC81 HD/PA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	WALL STOP	WS407CCV	630	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 25 EXISTING DOORS - USE FOR ALTERNATE # 2,3,5
DOOR NUMBER:

EACH TO HAVE:

1	SET	ALTERNATE HDWE	REUSE ALL EXISTING HARDWARE

HW SET: 26 EXISTING DOORS-USE FOR ALTERNATE # 4
DOOR NUMBER:

EACH TO HAVE:

1	SET	REUSE HARDWARE	REUSE ALL EXISTING HARDWARE EXCEPT
1	SET	LABOR	ADJUST DOOR HDWE AS NEEDED TO OPERATE

HW SET: 27 (MUST BE INCLUDED IN HARDWARE BASE B ID) (SEE ALT 6 FOR DELETION OF ACCESS CONTOL)
DOOR NUMBER:
ACCESS
CONTROL

EACH TO HAVE:

1	SET	SYSTEM TRAINING	TRAINING ON SYSTEM (8 HRS)	SCE
1	SET	SYSTEM SET UP	WIRING, FINAL CONNECTION, MOUNT COMPONENTS	SCE
1	SET	SYSTEM TESTING	SYSTEM DESIGN AND FINAL TESTING	SCE
100	EA	POWER SUPPLY	PS902 X BBK KL (FOR CONTROLLER)	SCE
1	EA	READER CONTROLLER	SBB	SCE
100	EA	PROXIMITY CARD	SXF7410	SCE

END OF SECTION

SECTION 08 80 00

GLAZING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Glass glazing for metal frames, and doors.
2. Plastic film for glazing at one-way observation window.
3. Glass glazing materials and installation requirements are included in this section for other sections referencing this section.

B. Related Sections:
1. Section 07 90 00 - Joint Protection: Sealant and back-up material other than glazing sealants.
2. Section 08 12 14 – Standard Steel Frames: Glazed frames.
3. Section 08 14 16 - Flush Wood Doors: Glazed doors.
4. Section 08 17 43 - FRP Doors and Aluminum Framing Systems.

1.2 REFERENCES

A. American National Standards Institute:
1. ANSI Z97.1 - Safety Glazing Materials Used in Buildings Safety.

B. American Society of Civil Engineers:
1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

C. ASTM International:
1. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
2. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass-Kind HS, Kind FT Coated and Uncoated Glass.
3. ASTM C1193 - Standard Guide for Use of Joint Sealants.
4. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
5. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings.
6. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation.

D. Consumer Products Safety Commission:
1. CPSC 16 CFR 1201 - Safety Standard for Architectural Glazing.

E. Glass Association of North America:
1. GANA - Sealant Manual.
2. GANA - Glazing Manual.

F. National Fenestration Rating Council Incorporated:
1. NFRC 100 - Procedures for Determining Fenestration Product U-Factors.
2. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.
3. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems.

G. National Fire Protection Association:

1. NFPA 80 - Standard for Fire Doors, Fire Windows.
2. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies.
3. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies.

H. Underwriters Laboratories Inc.:
1. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
2. UL - Building Materials Directory.

1.3 PERFORMANCE REQUIREMENTS

A. Provide glass and glazing materials for continuity of building enclosure:
1. In conjunction with materials described in Section 07 90 00.
2. To maintain continuous air barrier and vapor retarder throughout glazed assembly from glass pane to heel bead of glazing sealant.

B. Glass Thickness: Select minimum thickness in accordance with ASTM E1300 to resist specified design loads with the following maximum probability of breakage:
1. Vertical Glass: 8 lites per 1000 for wind loads with 3 seconds maximum load duration.
2. Sloped Glass: 1 lite per 1000 for wind and snow loads with 30 days maximum load duration.
3. Minimum Thickness: 1/4 inch for exterior glass.

C. Structural Design: Design in accordance with applicable code for most critical combination of wind, snow, seismic, and dead loads.

D. Roof Loads: Design sloped glass to resist live and dead loads.
1. Live Loads: As indicated on Drawings.
2. Dead Loads: Actual weight of materials incorporated into Work.

E. Wind Loads: Design and size glass to withstand positive and negative wind loads acting normal to plane of wall, including increased loads at building corners.
1. Design Wind Load: As indicated on Drawings.

F. Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated in accordance with applicable code.

G. Exterior Glass Deflection: Maximum of 1/175 of glass edge length or 3/4 inch, which ever is less with full recovery of glazing materials.

H. Interior Glass Deflection: Maximum differential deflection for two adjacent unsupported edges when 50 plf force is applied to one panel at any point up to 42 inches above finished floor less than thickness of glass.

I. Thermal and Solar Optical Performance: Measured or calculated in accordance with the following:
1. Maximum U-Values: Comply with ICC IEEC for climate zone in which project is located. Measure in accordance with NFRC 100.
2. Maximum SHGC: Comply with ICC IEEC for climate zone in which project is located. Measure in accordance with NFRC 200.
3. Solar Optical Properties: NFRC 300.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data:
   1. Glass: Provide structural, physical, and thermal and solar optical performance characteristics, size limitations, special handling or installation requirements.
   2. Glazing Sealants, Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors where exposed.

C. Design Data:
   1. Submit design calculations for glass thicknesses.

D. Manufacturer's Certificate: Certify sealed insulating glass, meets or exceeds specified requirements.

E. Installer's Certificate: Certify glass furnished without identification label is installed in accordance with Construction Documents and applicable code.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with GANA Glazing Manual, GANA Sealant Manual, for glazing installation methods.

B. Fire Rated Wall Glazing: Rating as indicated on Drawings.
   1. Tested Rating: Determined in accordance with ASTM E119.

C. Fire Rated Window Glazing: Tested in accordance with NFPA 257 and complying with NFPA 80.
   1. NFPA 257; adjusted so two-thirds of test specimen is above neutral pressure plane at 10 minutes into test.

D. Fire Rated Door Glazing: Tested in accordance with one of the following and complying with NFPA 80.
   1. NFPA 252; with neutral pressure level at 40 inches maximum above sill at 5 minutes into test.
   2. UL 10C.

E. Apply label from agency approved by authority having jurisdiction to identify each fire rated glass lite.

1.6 QUALIFICATIONS

A. Installer: Company specializing in performing Work of this section with minimum three years documented experience approved by manufacturer.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. Do not install glazing when ambient temperature is less than 50 degrees F.

C. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.8 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Furnish five year warranty to include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.

PART 2 PRODUCTS

2.1 FLOAT GLASS MATERIALS

A. Tempered Glass: ASTM C1048, Type 1 transparent flat, Quality Q3, Kind FT fully tempered, Condition A uncoated, float glass with horizontal tempering.
   1. Furnish tempered glass conforming to CPSC 16 CFR 1201 Category II.

2.2 FLOAT GLASS PRODUCTS

A. Float Glass Manufacturers:
   1. ACH Glass Operations.
   2. AFG Industries, Inc.
   3. Guardian Industries Corp.
   4. PPG Industries.
   5. Pilkington North America, Inc.
   6. Substitutions permitted.

B. Low E Glass: Annealed, Heat strengthened, and Tempered float glass as specified; Class 1 clear.
   1. Clear Low E annealed glass (FG-ECA).
   2. Clear Low E heat strengthened glass (FG-ECH).
   3. Clear Low E tempered glass (FG-ECT).
   4. Minimum Thickness: 1/4 inch.
   5. Solar Light Transmittance: 70 percent minimum.
   6. Solar Heat Gain Coefficient: 0.38 maximum.

2.3 FIRE RESISTIVE GLASS PRODUCTS

A. Fire Resistive Glass Manufacturers:
   1. Technical Glass Products.
   2. SAFTI First.
   3. Substitutions permitted.

B. Fire Resistive Film Faced Ceramic Safety Glass (FRG-FC): Transparent polished both surfaces, faced one side with clear plastic glazing film.
   1. Thickness: Manufacturer’s standard.
   2. Product: Fire Lite Plus manufactured by Technical Glass Products.
   3. Fire Rating: 90 minute rating as listed in UL Building Materials Directory and approved by authority having jurisdiction for applications indicated.
   4. Safety Glazing: Comply with CPSC 16 CFR 1201 Category II.

2.4 INSULATING GLASS PRODUCTS

A. Insulating Glass Manufacturers:
   1. AFG Industries, Inc..
   2. Arch Aluminum and Glass.
   3. Guardian Industries Corp.
   4. PPG Industries.
   5. Viracon.
   6. Substitutions permitted.

B. Insulating Glass: ASTM E2190 certified by Insulating Glass Certification Council; with silicone sealant edge seal; purge interpane space with dry hermetic air.
   1. Total Unit Thickness: 1 inch unless otherwise indicated.
   2. Insulating Glass Unit Edge Seal Construction: Aluminum, bent and soldered corners.

C. Double Pane Insulating Vision Glass (IG-DP):
   1. Total Unit Thickness: 1 inch unless otherwise indicated.
   2. Outer Pane: Glass Type FG-ECT.
   3. Inner Pane: Glass Type FG-CT.

2.5 GLAZING SEALANTS

A. Elastomeric Glazing Sealants: Materials compatible with adjacent materials including glass, insulating glass seals, and glazing channels.
   1. Silicone Glazing Sealant: ASTM C920, Type S, Grade NS, Class and Use suitable for glazing application indicated; single component; chemical curing; capable of water immersion without loss of properties; non-bleeding, non-staining, cured Shore A hardness of 15 to 25; compounded by manufacturer specifically for glazing.
      a. Structural Silicone: Furnish high-modulus structural silicone glazing materials where sealant bonds glass to substrate.

B. Pre-Formed Glazing Tape: Size to suit application.
   1. Preformed butyl compound; 10 to 15 Shore A durometer hardness; coiled on release paper; black color.
      a. Butyl Corner Sealant: ASTM C920 single component non-skinning butyl compatible with glazing tape; color to match tape.

2.6 GLAZING ACCESSORIES

A. Setting Blocks: Elastomeric material recommended by glass manufacturer, 80 to 90 Shore A durometer hardness, length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

B. Spacer Shims: Elastomeric material recommended by glass manufacturer, 50 to 60 Shore A durometer hardness, minimum 3 inch long x one half the height of glazing stop x thickness to suit application.

C. Glazing Clips: Manufacturer's standard type.

D. One way mirror (observation room) film: Silver-1560 mirrored silver as manufactured by SOLYX Films or equal.

E. Fire-Resistant Glazing Materials: Materials used to obtain required fire-resistant rating.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify openings for glazing are correctly sized and within acceptable tolerance.

C. Verify surfaces of glazing channels or recesses are clean, free of obstructions impeding moisture movement, weeps are clear, and ready to receive glazing.

3.2 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant.

3.3 INSTALLATION

A. Perform installation in accordance with GANA Glazing Manual.
   1. Glazing Sealants: Comply with ASTM C1193.
   2. Fire Rated Openings: Comply with NFPA 80.

B. Exterior Wet/Dry Method (Preformed Tape and Sealant) Installation:
   1. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with compatible butyl sealant.
   2. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapor seal.
   3. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
   4. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.
   5. Install removable stops, with spacer strips inserted between glazing and applied stops, 1/4 inch below sight line. Place glazing tape on glazing pane or unit with tape 1/4 inch below sight line.
   6. Fill gap between glazing and stop with elastomeric glazing sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.
   7. Apply cap bead of elastomeric glazing sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

C. Interior Dry Method (Tape and Tape) Installation:
   1. Cut glazing tape to length and set against permanent stops, projecting 1/16 inch above sight line.
   2. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
   3. Rest glazing on setting blocks and push against tape for full contact at perimeter of pane or unit.
   4. Place glazing tape on free perimeter of glazing in same manner described above.
   5. Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
   6. Knife trim protruding tape.

D. Interior Wet/Dry Method (Tape and Sealant) Installation:
   1. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sight line.
   2. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
   3. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.
   4. Install removable stops, spacer shims inserted between glazing and applied stops at 24 inch intervals, 1/4 inch below sight line.
   5. Fill gaps between pane and applied stop with elastomeric glazing sealant to depth equal to bite on glazing, to uniform and level line.

6. Trim protruding tape edge.

E. Plastic Film Installation:
1. Install plastic film in accordance with manufacturer's instructions.
2. Place without air bubbles, creases or visible distortion.
3. Fit tight to glass perimeter with razor cut edge.

3.4 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.

B. Remove glazing materials from finish surfaces.

C. Remove labels after Work is complete.

D. Clean glass and adjacent surfaces.

3.5 SCHEDULE

A. Exterior Entrances: Type IG-DP, exterior wet/dry method with silicone glazing sealant exterior.

B. Interior Non-Fire Rated Metal Doors and Frames: Type FG-CT, interior wet/dry method.

C. Interior Non-Fire Rated Wood Doors: Type FG-CT, interior dry method.

D. Interior Fire Rated Doors and Windows: Type FRG-FC, with fire rated glazing system.

END OF SECTION

SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Resilient metal channels.
2. Gypsum board and joint treatment.
3. Tile backer board.
4. Acoustic insulation.
5. Textured finishes.

B. Related Requirements:
1. Section 06 10 00 - Rough Carpentry: Building wood framing system.

1.2 REFERENCE STANDARDS

A. ASTM International:
1. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
2. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members.
3. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
4. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board.
5. ASTM C1002 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases.
6. ASTM C1047 – Standard Specifications for Accessories for Gypsum Wallboard.
7. ASTM C1325 - Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cement Substrate Sheets.
8. ASTM C1396/C1396M - Standard Specification for Gypsum Board.

B. Gypsum Association:
1. GA 214 - Recommended Levels of Gypsum Board Finish.
2. GA 216 - Application and Finishing of Gypsum Board.
3. GA 600 - Fire Resistance Design Manual Sound Control.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data on metal channels, gypsum board, joint tape; decorative finish, and acoustical accessories.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ASTM C840, GA-214, GA-216 and GA-600 as applicable.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

A. Manufacturer List:
1. Georgia-Pacific Corporation.
2. National Gypsum Co.
3. United States Gypsum Co.
4. Gold Bond Building Products
5. Or equal

2.2 COMPONENTS

A. Framing Materials:
1. Furring, Framing, and Accessories: ASTM C645.

B. Gypsum Board Materials: ASTM C1396/C1396M; Type X fire resistant where indicated on Drawings.
1. Standard Gypsum Board: 1/2 inch thick, maximum available length in place; ends square cut, tapered edges.

C. Tile Backer Boards:
1. Fiber Mat Reinforced Cement Tile Backer Board: ASTM C1325; high density, glass fiber reinforced; 1/2 inch thick.
2. Tile Backer Board Joint Tape: 2 inch wide, coated glass fiber tape for joints and corners.

2.3 ACCESSORIES

A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced, 3 inch thick batts 1 inch wider than stud cavity for creased installation. Equal to ThermaFiber SAFB as manufactured by USG.

B. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board; as specified in Section 07 90 00.

C. Gypsum Board Accessories: ASTM C1047; metal; corner beads, edge trim, and expansion joints.
1. Metal Accessories: Galvanized steel.
2. Edge Trim: Type LC, L, and U bead as required.

D. Joint Materials: ASTM C475/C475M; reinforcing tape, joint compound, and water.

E. Textured Finish Materials (Knock-down): Sheetrock Brand Multi-Purpose Wall and Ceiling Spray Texture or equal/.

F. Gypsum Board Screws: ASTM C1002; length to suit application.
   1. Screws for Steel Framing: Type S.
   2. Screws for Wood Framing: Type W.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify site conditions are ready to receive work and opening dimensions are as indicated on shop drawings.

3.2 DEMOLITION

A. Extend existing gypsum board installations using materials and methods as specified.

B. Repair and remodel existing gypsum board assemblies which remain or are to be altered.

3.3 INSTALLATION

A. Acoustic Accessories Installation:
   1. Install resilient channels at maximum 16 inches on center. Locate joints over framing members.
   2. Place acoustic insulation in partitions tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind partitions, and tight to items passing through partitions. Field score SAFB insulation full height along center, 1 inch deep.
   3. Install acoustic sealant at gypsum board perimeter at:
      a. Framing: One bead.
      b. Seal penetrations of partitions by conduit, pipe, duct work, rough-in boxes, and

B. Gypsum Board Installation:
   1. Install gypsum board in accordance with ASTM C840, GA-216, and GA-600.
   2. Erect single layer standard gypsum board in most economical direction, with ends and edges occurring over firm bearing.
   3. Use screws when fastening gypsum board to metal furring or framing.
   4. Double Layer Applications: Secure second layer to first with fasteners and adhesive and sufficient support to hold in place.
   5. Place second layer perpendicular to first layer. Offset joints of second layer from joints of first layer.
   6. Erect exterior gypsum soffit board perpendicular to supports, with staggered end joints over supports.
   7. Place control joints consistent with lines of building spaces as directed or as otherwise required to prevent cracking in finished surfaces.
   8. Place corner beads at external corners. Use longest practical length. Place edge trim where gypsum board abuts dissimilar materials.

C. Tile Backer Board Installation:
   1. Install boards parallel to framing members. All parallel edges must be supported over framing members.
   2. Score and snap sheets to required sizes and make necessary cutouts.

3. Install sheets 1/4" above floor.
4. Fasten cement board with screws a maximum of 8" around perimeter all supporting studs. Keep fasteners 3/8" from sheet edges and 2" from sheet corners.
5. Set fastener heads flush with the surface, without overdriving.
6. Fill all joints with mortar.
7. Embed joint tape in the mortar and level.

D. Joint Treatment:
1. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
2. Feather coats on to adjoining surfaces so that camber is maximum 1/32 inch.
3. Taping, filling and sanding is required on all exposed to view surfaces.
4. Taping and filling is required on all concealed surfaces.
5. Fill and finish joints and corners of cementitious backing board.

E. Texture Finish (Knock-down):
1. Apply texture to substrate using hopper and manufacturer's recommended spray equipment to produce spatter texture.
2. During setting process, knock-down high surfaces of texture using flexible, broad blade acrylic knife.

3.4 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Variation of Finished Gypsum Board Surface from Flat Surface: 1/8 inch in 10 feet.

END OF SECTION

SECTION 09 30 00

TILING

PART 1 GENERAL

1.1 SUMMARY

A. Section includes ceramic, tile for floor and wall applications; thin-set application method; cementitious backer board as tile substrate; thresholds at door openings; and ceramic accessories.

B. Related Sections:
1. Section 09 21 16 – Gypsum Board Assemblies: Installation of cementitious tile backer board on walls.

1.2 REFERENCES

A. American National Standards Institute:
1. ANSI A108.1 - Installation of Ceramic Tile, A collection.
2. ANSI A108.1B - Specifications for Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set or Latex Portland Cement Mortar.
3. ANSI A108.10 - Specifications for Installation of Grout in Tilework.
4. ANSI A108.11 – Specifications for Installation of Interior Cementitious Backer Units.
5. ANSI A108.13 – Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone.
6. ANSI A118.1 - Standard Specification for Dry-Set Portland Cement Mortar.
7. ANSI A118.4 - Latex-Portland Cement Mortar.
8. ANSI A118.6 - Ceramic Tile Grouts.
9. ANSI A118.9 - Test Methods and Specifications for Cementitious Backer Units.
10. ANSI 118.10 – Load Bearing, Bonded, Waterproof Membranes for Thin-Set Tile & Dimension Stone Installation.
11. ANSI A137.1 - Ceramic Tile.

B. Tile Council of America:
1. TCA - Handbook for Ceramic Tile Installation.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate tile layout, patterns, color arrangement, perimeter conditions, junctions with dissimilar materials, control and expansion joints, thresholds, ceramic accessories, and setting details.

C. Product Data: Submit instructions for using grouts..

D. Samples:
1. Submit samples illustrating pattern, and color variations.
2. Submit samples of external bullnose metal trim for selection.

E. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Operation and Maintenance Data: Submit recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with TCA Handbook and ANSI A108 Series/A118 Series.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Protect adhesives and grouts from freezing or overheating.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. Do not grouts in unventilated environment.

C. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

PART 2 PRODUCTS

2.1 TILE

A. Manufacturers:
1. American Florium.
2. American Olean Tile Co.
3. Crossville Porcelain Stone.
4. Dal Tile International.
5. Metropolitan Ceramics.
6. Summitville Tiles.

2.2 COMPONENTS

A. Ceramic Floor Tile: ANSI A137.1, conforming to the following:
1. Size: 4 x 4 x 1/4 inch.
2. Shape: Square.

3. Edge: Cushioned.
4. Surface Finish: Slip resistant.
5. Color: As selected.

B. Ceramic Wall Tile: ANSI A137.1, conforming to the following:
1. Size: 4 x 4 x 1/4 inch.
2. Shape: Square.
3. Edge: Cushioned.
4. Surface Finish: Glazed.
5. Color: As selected.

C. Porcelain Tile: “Tundra” simulated slate as manufactured by American Florium (no substitutions); ANSI A137.1, conforming to the following:
1. Size: 12 x 12 x 1/4 inch and 6 x 6 x 1/4 inch.
2. Shape: Square.
3. Edge: Cushioned.
4. Surface Finish: Unpolished.
5. Color: As selected.

D. Base: Same as floor tile.
1. Length: Tile length.
2. Height: 4 inch.

2.3 ACCESSORIES

A. Mortar Materials:
1. Mortar Bed Materials: ANSI A108.1B; portland cement, sand, latex additive, and water; proportioned in accordance with applicable code.
2. Mortar Bond Coat Materials:
a. Latex-Portland Cement type: ANSI A118.4.

B. Grout Materials:
1. Grout: Latex-Portland cement type as specified in ANSI A118.6; color as selected.
2. Silicone Rubber Grout: Silicone sealant, moisture and mildew resistant type, complying with ANSI A118.6, color as selected; use for shower floors and walls.

C. Waterproofing Membrane at shower floors and walls: 9235 Waterproofing Membrane as manufactured by Laticrete.

D. Membrane at other Walls specified: 4 mil thick polyethylene film.

E. Cementitious Backer Board: ANSI A118.9; High density, cementitious, glass fiber reinforced, 1/2 inch thick; 2 inch wide coated glass fiber tape for joints and corners. Durock as manufactured by USG or equal.

F. Thresholds at shower openings and where shown on Drawings: Marble type, white color, honed finish, 4 x 1/2 inch size by full width of opening, beveled both sides to meet ADA / Michigan Barrier Free requirements, radiused edges from bevel to vertical face.

G. Thresholds at changes in floor finish: Extruded aluminum, with integral edge strip, where floor tile abuts dissimilar flooring materials (ie. carpeting, VCT).

H. External Corner Trim: Provide decorative bullnosed metal edge trim at external corners in wall assemblies, profile color and finish as selected by Architect.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify surfaces are ready to receive work.

3.2 PREPARATION

A. Protect surrounding work from damage.

B. Vacuum clean surfaces.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

D. Install cementitious backer board. Tape joints and corners, cover with skim coat of dry-set mortar to feather edge.

3.3 INSTALLATION

A. Install tile, thresholds, and grout in accordance with applicable requirements of ANSI A108.1 through A108.10, and TCA Handbook recommendations.

B. Install waterproof membrane per manufactures installation instructions and ANSI A108.13.

C. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

D. Place thresholds and edge strips at exposed tile edges and locations indicated.

E. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor, base and wall joints.

F. Place tile with joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.
   1. Ceramic Tile: 1/8 inch.
   2. Porcelain Tile: 1/4 inch.

G. Form internal angles square.

H. Provide decorative bullnosed metal trim for external angles.

I. Sound tile after setting. Replace hollow sounding units.

J. Allow tile to set for a minimum of 48 hours prior to grouting.

K. Grout tile joints.

L. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

M. Installation - Floors - Thin-Set Methods:
   1. Over interior concrete substrates, install in accordance with TCA Handbook Method F113, dry-set or latex-portland cement bond coat, unless otherwise indicated.
   2. Over wood substrates, install in accordance with TCA Handbook Method F144, with, unless otherwise indicated.

N. Installation – Shower Walls:
   1. At tiled shower receptors install in accordance with TCA Handbook Method B415, mortar bed floor, and W244, thin-set over cementitious backer unit walls.
   2. Grout with silicone rubber grout.
   3. Seal joints between tile work and other work with sealant Type specified in Section 07 90 00.

O. Installation - Wall Tile:
   1. Over cementitious backer units install in accordance with TCA Handbook Method W244, using membrane at toilet rooms.

3.4 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.

B. Clean tile and grout surfaces.

3.5 PROTECTION OF INSTALLED CONSTRUCTION

A. Section 01 70 00 - Execution and Closeout Requirements: Protecting installed construction.

B. Do not permit traffic over finished floor surface for 4 days after installation.

END OF SECTION

SECTION 09 51 13

ACOUSTICAL PANEL CEILINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Acoustic panels.
2. Suspended metal grid ceiling system and perimeter trim.
3. Supplementary acoustic insulation over system units.

B. Related Requirements:
1. Section 23 37 00 - Air Outlets and Inlets: Air diffusion devices in ceiling system.
2. Section 26 51 00 - Interior Lighting: Light fixtures in ceiling system.
3. Section 28 31 00 - Fire Detection and Alarm: Fire alarm components in ceiling system.

1.2 REFERENCE STANDARDS

A. ASTM International:
1. ASTM C635 - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings.
2. ASTM C636 - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. Ceilings and Interior Systems Construction Association:
1. CISCA - Acoustical Ceilings: Use and Practice.

1.3 SEQUENCING

A. Section 01 10 00 - Summary: Requirements for sequencing.

B. Sequence Work to ensure acoustic ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.

C. Install acoustic units after interior wet work is dry.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data on metal grid system components, acoustic units and panels.

C. Samples:
1. Submit samples illustrating material and finish of acoustic units.

D. Manufacturer's Instructions: Submit special procedures, and perimeter conditions requiring special attention.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for maintenance materials.

B. Extra Stock Materials:
   1. Furnish 2% percent of total acoustic unit area of extra tile panels metal pans to Owner.

1.6 QUALITY ASSURANCE

A. Conform to CISCA requirements.

B. Surface Burning Characteristics: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing work of this section with minimum three years documented experience.

1.8 AMBIENT CONDITIONS

A. Section 01 50 00 - Temporary Facilities and Controls: Ambient conditions control facilities for product storage and installation.

B. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustic unit installation.

PART 2 PRODUCTS

2.1 SUSPENDED ACOUSTICAL CEILINGS

A. Manufacturer List:
   1. United States Gypsum Company as basis of design.
   2. No substitutions.

B. Performance / Design Criteria:
   1. Suspension System: Rigidly secure acoustic ceiling system including integral mechanical and electrical components with maximum deflection of 1/240

2.2 COMPONENTS

A. Acoustic Panels to match existing: ASTM E1264, Type III, Form 2, Pattern CDE, Equal to Radar as Manufactured by USG Interior Systems, conforming to the following:
   1. Size: 24 x 48 inches.
   2. Thickness: 5/8 inches.
   3. Composition: Mineral.
   4. Light Reflectance: 80 percent minimum.
   5. Edge: SQ

6. Surface Color: White.
7. Surface Finish: Perforated (small holes), fissured, lightly textured.

B. Grid:
1. Non-fire Rated Grid: ASTM C635, intermediate duty; exposed T; components die cut and interlocking.
2. Grid Materials: Cold rolled aluminum.
3. Exposed Grid Surface Width: 15/16 inch.
4. Perimeter Molding Width: Match grid width.
5. Grid Finish: White.
6. Accessories: Trim for interior square corners.
7. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.

2.3 ACCESSORIES

A. Acoustic Batt Insulation: Specified in Section 09 21 16, unfaced; 3 inch thick.

B. Touch-up Paint: Type and color to match acoustic and grid units.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify layout of hangers will not interfere with other work.

3.2 DEMOLITION

A. Extend existing acoustical ceiling installations using materials and methods as specified.

3.3 INSTALLATION

A. Lay-In Grid Suspension System:
1. Install suspension system in accordance with ASTM C635, ASTM C636 and as supplemented in this section.
2. Locate system on room axis according to reflected plan.
3. Install after major above ceiling work is complete. Coordinate location of hangers with other work.
4. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
5. Where ducts or other equipment prevent regular spacing of hangers, reinforce nearest affected hangers and related carrying channels to span extra distance.
6. Do not support components on main runners or cross runners when 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.
7. Do not eccentrically load system, or produce rotation of runners.
8. Perimeter Molding:
a. Install edge molding at intersection of ceiling and vertical surfaces.

b. Use longest practical lengths.
c. Overlap and rivet corners.
d. Install at junctions with other interruptions.

9. Install straight trim cover at interior grid corners.

B. Acoustic Units:
1. Fit acoustic units in place, free from damaged edges or other defects detrimental to appearance and function.
2. Lay directional patterned units one way with pattern parallel to shortest room axis. Fit border trim neatly against abutting surfaces.
3. Install units after above ceiling work is complete.
4. Install acoustic units level, in uniform plane, and free from twist, warp, and dents.
5. Cutting Acoustic Units:
a. Cut to fit irregular grid and perimeter edge trim.
b. Cut square reveal edges to field cut units.
6. Lay acoustic insulation above panels where indicated on Drawings.
7. Install hold-down clips to retain panels tight to grid system in vestibules and within 20 ft of exterior doors in corridors without vesitbules.

3.4 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

C. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION

SECTION 09 68 16

SHEET CARPETING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Sheet carpet direct-glued to substrate.
   2. Resilient wall base.
   3. Accessories.

B. Related Sections:
   1. Section 09 30 00 Tiling: Termination edging of adjacent floor finish.

1.2 PRICE AND PAYMENT PROCEDURES

A. Sheet Carpet Allowance: Allowance includes furnishing sheet carpet material. Installation and accessory materials are included in this section and is part of Contract Sum/Price.

1.3 REFERENCE STANDARDS

A. ASTM International:
   1. ASTM D2859 - Standard Specification for Ignition Characteristics of Finished Textile Floor Covering Materials.

B. Carpet and Rug Institute:
   1. CRI Carpet Installation Standard - Standard for Installation of Commercial Carpet.
   2. CRI Model Specifications for Commercial Carpets.

C. Consumer Products Safety Commission:
   1. CPSC 16 CFR 1630 - Standard for the Surface Flammability of Carpets and Rugs.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

C. Shop Drawings: Indicate seaming plan, method of joining seams, direction of carpet pile and pattern, location of edge moldings and edge bindings.
   1. Submit samples of edge strips and base material for each color specified.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for submittals.

B. Operation and Maintenance Data: Submit maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

1.6 QUALITY ASSURANCE

A. Surface Burning Characteristics:
   1. Floor Finishes: Comply with one of the following:
      a. Class I, minimum 0.45 watts/sq cm when tested in accordance with NFPA 253.
      b. CPSC 16 CFR 1630 and ASTM D 2859.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installation must be performed by a firm with not less than five (5) years of experience in installation of commercial carpet, by methods similar to those required for this project.
   1. FCIB or IFCI certified carpet installers.

C. Installation must be performed by an installer that is pre-approved in writing by the manufacturer. The agreement between the manufacturer and the installation company must specifically address all installation procedures and materials in order to coordinate with warranties offered by the manufacturer.

1.8 AMBIENT CONDITIONS

A. Section 01 50 00 - Temporary Facilities and Controls: Ambient conditions control facilities for product storage and installation.

B. Store materials in area of installation for 48 hours prior to installation.

C. Maintain minimum 70 degrees F ambient temperature 3 days prior to, during and 24 hours after installation.

D. Ventilate installation area during installation and for 3 days after installation.

PART 2 PRODUCTS

2.1 MATERIALS

A. Carpeting Material Allowance: Include an allowance for the purchase of carpeting. Owner will select carpeting for purchase by the Contractor. Any adjustment (add or deduct) in the bid price will be made following purchase by Change Order. Refer to Section 01 20 00 for allowance amount and basis of cost.

B. Resilient Base:
   1. Base: FS SS-W-40, Type 2 vinyl; Vinyl; top set coved. Patterns and colors as selected by Architect.
      a. Height: 4 inch.
      b. Thickness: 1/8 inch thick.
      c. Length: 4 foot sections.
      d. Manufacturers:
         1) Burke Flooring Products.
         2) Johnsonite - Johnson Rubber Company.
         3) Kentile Floors, Inc.

2.2 ACCESSORIES

A. Sub-Floor Filler: White premix latex; type recommended by flooring material manufacturer.

B. Moldings and Edge Strips: Vinyl, color as selected.

C. Floor Primer: Manufacturer's approved floor primer applied to all areas that are to receive carpeting.

D. Seam Adhesive: Recommended by manufacturer.

E. Contact Adhesive: Recommended by manufacturer for installation of carpeting [and base].

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify that substrate surfaces are smooth and flat with maximum variation of 1/8" inch in 10' ft. and are ready to receive work. Correct any deviations in substrate to the satisfaction of the Owner/Architect.

C. Verify concrete floors are ready for sheet carpet installation by testing for moisture emission rate and alkalinity. Obtain instructions when test results are not within specified limits.
   1. Moisture emission rate: Not greater than 3 lb per 1000 sq ft per 24 hours when tested using calcium chloride moisture test kit for 72 hours.
   2. Alkalinity: pH range of 5-9.

3.2 PREPARATION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation preparation.

B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler.

C. Apply, trowel, and float filler to achieve smooth, flat, hard surface. Prohibit traffic until filler is cured.

D. Vacuum clean substrate.

3.3 INSTALLATION - CARPET

A. Install sheet carpet in accordance with CRI Carpet Installation Standard and manufacturers instructions.

B. Installation of carpet must proceed in strict accordance with manufacturer's printed installation instructions. This includes the use of adhesives and seam sealers supplied by the manufacturer.

C. Verify sheet carpet match before cutting to ensure minimal variation between dye lots.

D. Lay out sheet carpet and locate seams in accordance with CRI Carpet Installation Standard section 6.2:
   1. Locate seams in area of least traffic, out of areas of pivoting traffic, and parallel to main traffic.
   2. Do not locate seams perpendicular through door openings.
   3. Align run of pile in same direction as anticipated traffic and in same direction on adjacent pieces.
   4. Locate change of color or pattern between rooms under door centerline.
   5. Provide monolithic color, pattern, and texture match within each contiguous area.

E. Install sheet carpet tight and flat on subfloor, well fastened at edges, with uniform appearance.

F. Double cut sheet carpet seams , with accurate pattern match. Make cuts straight, true, and unfrayed. Apply seam adhesive to cut edges of woven sheet carpet immediately.

G. Direct Glue-Down Installation: CRI Carpet Installation Standard Section 13.
   1. Apply contact adhesive to floor uniformly at rate recommended by manufacturer. After sufficient open time, press sheet carpet into adhesive.
   2. Apply seam adhesive. Lay adjoining piece with seam straight, not overlapped or peaked, and free of gaps.
   3. Roll with appropriate roller for complete contact of adhesive to sheet carpet backing.

H. Trim sheet carpet neatly at walls and around interruptions.

I. Complete installation of edge strips, concealing exposed edges. [Bind cut edges where not concealed by edge strips.]

3.4 INSTALLATION – RESILIENT BASE

A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.

B. Miter internal corners. Wrap base around bullnose CMU at external corners.

C. Install base on solid backing. Bond tight to wall and floor surfaces.

D. Scribe and fit to door frames and other interruptions.

E. Install base on all casework kick boards.

3.5 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for cleaning.

B. Remove excess adhesive without damage, from floor, base, and wall surfaces.

C. Clean and vacuum sheet carpet surfaces.

3.6 PROTECTION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.

B. Do not permit traffic over unprotected floor surface.

C. Cover carpeting in traffic areas with protective non-staining building paper. Do not use plastic sheeting.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 GENERAL

1.1 SUMMARY

A. Section includes surface preparation and field application of paints, stains, varnishes, and other coatings.

B. Related Sections:
1. Section 08 12 14 - Standard Steel Frames: Metal frames requiring field finish.
2. Section 08 34 61 - Bullet Resistant Wood Door and Frame Assembly: Wood door and metal frame requiring field finishing.
3. Section 08 52 00 - Wood Windows: Wood windows requiring field finish.
4. Section 08 56 13 - Bullet Resistant Transaction Windows: Metal frame requiring field finish.
5. Section 22 10 05 - Plumbing Piping: Exterior exposed to view gas piping requiring painting.
6. Section 26 05 34 - Conduit: Exterior exposed to view electrical conduit requiring painting.

1.2 REFERENCES

A. ASTM International:
1. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications.
2. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.
3. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. SSPC: The Society for Protective Coatings:
1. SSPC - Steel Structures Painting Manual.

1.3 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this section.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit data on finishing products.

C. Samples:
1. Submit paper chip samples illustrating range of colors available for each surface finishing product scheduled.
2. Submit transparent finish samples, illustrating selected colors for each color and system selected on wood species being installed.

D. Manufacturer's Installation Instructions: Submit special surface preparation procedures, substrate conditions requiring special attention.

1.5 CLOSEOUT SUBMITTALS

A. Section 01 70 00 - Execution and Closeout Requirements: Closeout procedures.

B. Operation and Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

1.6 QUALITY ASSURANCE

A. Surface Burning Characteristics:
   1. Fire Retardant Finishes: Maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

B. Applicator: Company specializing in performing work of this section with minimum three years documented experience and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

C. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

D. Paint Materials: Store at minimum ambient temperature of 45 degrees F and maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.9 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements.

B. Do not apply materials when surface and ambient temperatures are outside temperature ranges required by paint product manufacturer.

C. Do not apply exterior coatings during rain or snow when relative humidity is outside humidity ranges, or moisture content of surfaces exceed those required by paint product manufacturer.

D. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

E. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

F. Provide lighting level of 80 ft candle measured mid-height at substrate surface.

1.10 SEQUENCING

A. Sequence application to the following:
   1. Do not apply finish coats until paintable sealant is applied.
   2. Back prime wood trim before installation of trim.

1.11 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Product warranties and product bonds.

B. Furnish five year manufacturer warranty for paints and coatings.

1.12 EXTRA MATERIALS

A. Section 01 70 00 - Execution and Closeout Requirements: Spare parts and maintenance products.

B. Supply 1 gallon of each color, type, and surface texture; store where directed.

C. Label each container with color, type, and texture, in addition to manufacturer's label.

PART 2 PRODUCTS

2.1 PAINTS AND COATINGS

A. Manufacturers: Paint
   1. Glidden Coatings and Resins
   2. Benjamin Moore and Company
   3. Sherwin Williams Company
   4. Valspar Corporation
   5. Devoe Paint Co.
   6. Fuller-O’Brien.
   7. PPG Architectural Finishes.

2.2 COMPONENTS

A. Coatings: Ready mixed, except field catalyzed coatings. Prepare coatings:
   1. To soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating.
   2. For good flow and brushing properties.
   3. Capable of drying or curing free of streaks or sags.

B. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve finishes specified; commercial quality.

C. Patching Materials: Latex filler.

D. Fastener Head Cover Materials: Latex filler.

2.3 FINISHES

A. Exterior Paint Systems (EPS-1):

1. System EPS-1: Gloss Alkyd Enamel:
   a. 1st Coat; (Primer):
      1) Ferrous Metal: Red oxide primer.
      2) Galvanized Metal: Galvanized primer.
   b. 2nd Coat and 3rd Coat:
      1) Gloss Alkyd Enamel.
2. Apply to the following scheduled exterior surfaces:
   a. Hollow metal doors and frames with exterior exposure on at least one side.
   b. Miscellaneous metal items.
   c. All grills, registers, and diffusers specified to be field finished.
   d. Gas piping and meter.
   e. Bollards and guard posts.

B. Interior Paint Systems IPS-1:
1. Latex Base, Satin Finish:
   a. 1st Coat: (Primer):
      1) Gypsum Drywall: Latex Primer.
      2) Concrete Masonry Units: Surface Filler.
      3) Concrete: Latex Primer.
   b. 2nd Coat and 3rd Coat: Latex base emulsion, satin sheen. Color as selected by Architect.
2. Apply to the following interior surfaces as scheduled:
   a. Gypsum board walls and ceilings except as otherwise noted or scheduled to be unfinished.
   b. Other surfaces and rooms as scheduled on the Room Finish Schedule.

C. Interior Paint System IPS-2:
1. System IPS-2; Epoxy Paint, Gloss, Solvent Based: Equal to Sherwin Williams – Tile Clad II.
   a. 1st Coat: Primer/Sealer epoxy solvent based.
   b. 2nd and 3rd Coats: Epoxy Paint (7 mills total); color as selected by Architect.
2. Apply to the following interior surfaces as scheduled:
   a. Walls surfaces scheduled to receive IPS-2.

D. Interior Paint System IPS-3:
1. Semi-Gloss Enamel:
   a. 1st Coat: (Primer)
      1) Ferrous metal: Red oxide primer.
      2) Galvanized metal: Galvanized primer.
   b. 2nd Coat: Ferrous Metal and Galvanized Metal: Enamel Undercoater.
   c. 3rd Coat: Odorless Alkyd Enamel, Semi-Gloss.
2. Apply to the following interior surfaces:
   a. Hollow metal doors and frames with no exterior exposure on either side.
   b. Miscellaneous steel and metal items exposed to view except as noted otherwise.
   c. Other surfaces and rooms as indicated on the Room Finish Schedule.
   d. Exposed to view mechanical and electrical items specified to be field finished.

E. Interior Transparent Finish System ITF:
1. System ITF; Oil Stain and Satin Finish.
   a. 1st Coat: Open grained wood; Paste wood filler.
   b. 2nd Coat: Interior Oil Stain.
   c. 3rd Coat: Elkyd (Sanding Sealer).
   d. 4th and 5th Coat: Elkyd Satin Finish.
2. Apply to the following interior surfaces:

a. All exposed to view standing and running wood trim.
b. Interior surfaces of wood window frames and trim.
c. Bullet resistant wood door.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify surfaces and substrate conditions are ready to receive Work as instructed by product manufacturer.

C. Examine surfaces scheduled to be finished prior to commencement of work. Report conditions capable of affecting proper application.

D. Test shop applied primer for compatibility with subsequent cover materials.

E. Measure moisture content of surfaces using 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. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

3.2 PREPARATION

A. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

B. Surfaces: Correct defects and clean surfaces capable of affecting work of this section. Remove or repair existing coatings exhibiting surface defects.

C. Marks: Seal with shellac those which may bleed through surface finishes.

D. Impervious Surfaces: Remove mildew by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

E. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.

F. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.

G. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.

H. Plaster Surfaces: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

I. Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by [hand] [power tool] wire brushing or sandblasting; clean by washing with solvent. Apply treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.

J. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.

K. Interior Wood Items Scheduled to Receive Paint Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.

L. Interior Wood Items Scheduled to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats.

M. Wood Doors Scheduled for Painting: Seal wood door top and bottom edge surfaces with clear sealer.

3.3 EXISTING WORK

A. Extend existing paint and coatings installations using materials and methods compatible with existing installations and as specified.

3.4 APPLICATION

A. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

B. Apply each coat to uniform appearance. Apply each coat of paint slightly darker than preceding coat unless specified otherwise.

C. Sand wood and metal surfaces lightly between coats to achieve required finish.

D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

E. Where clear finishes are required, tint fillers to match wood. Work fillers into grain before set. Wipe excess from surface.

F. Prime concealed surfaces of interior and exterior woodwork with primer paint.

G. Prime concealed surfaces of interior wood surfaces scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with thinner.

H. Finishing Mechanical And Electrical Equipment:
   1. Paint exterior exposed to view gas piping.
   2. Paint interior surfaces of air ducts visible through grilles and louvers with one coat of flat black paint to visible surfaces. Paint dampers exposed behind louvers, grilles, to match face panels.
   3. Paint exterior exposed to view conduit and electrical equipment.
   4. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.5 CLEANING

A. Section 01 70 00 - Execution and Closeout Requirements: Final cleaning.

B. Collect waste material which may constitute fire hazard, place in closed metal containers, and remove daily from site.

END OF SECTION

SECTION 10 14 00

SIGNAGE

PART 1 GENERAL

1.1 SUMMARY

A. Section includes interior signs.

1.2 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate sign styles, lettering font, foreground and background colors, locations, overall dimensions of each sign.

C. Samples: Submit sign, full size illustrating type, style, letter font, and colors specified; method of attachment.

D. Manufacturer's Installation Instructions: Submit installation template and attachment devices.

1.3 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

1.4 REGULATORY REQUIREMENTS

A. American With Disabilities Act (ADA) Requirements: Manufacturer shall conform with ADA requirements. ADA requirements shall supersede technical specifications of this section. Manufacturer's shall conform to tactile, braille, letter size, and other requirements as may be required by ADA Accessibility Guidelines For Buildings and Facilities, Article 4.30 Signage.

B. ANSI A117.1 – 2003 Accessible and Usable Buildings and Facilities.

C. International Building Code – 2009.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Package signs, labeled in name groups.

C. Store adhesive attachment tape at ambient room temperatures.]

1.6 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 - Product Requirements: Environmental conditions affecting products on site.

B. Do not install signs when ambient temperature is lower than recommended by manufacturer.

C. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.1 INTERIOR SIGNS

2.2 COMPONENTS

A. Photpolymer Signs: Equal to InTouch ADA- Ready Sign System as manufactured by ASI with requirements indicated for materials, thickness, finish colors, designs, shapes, sizes and details.
   1. Photopolymer Face, in matte (non-glare) finish.
   2. Backing Plate: Acrylic.
   3. Tactile Graphics and Text:
      a. Fabrication process: Provide tactile copy [and grade 2 Braille] raised 1/32 inch minimum from plaque first surface by manufacturer's photopolymer bonded process. Signface of single material, tactile characters and Braille integral to photopolymer. Adhesive-fixed characters are not acceptable.
      b. Provide lettering and graphics precisely formed, uniformly opaque to comply with relevant ADA regulations and requirements indicated for size, style, spacing, content, position, and colors. Tactile characters to be raised min. 1/32" from surface. Computerized translation of sign copy to be responsibility of the manufacturer.
   4. Mounting Panel Options:
      a. Size: Same size.
      b. Thickness: .125 inch thick matte finished acrylic.
   5. Background Appearance Options:
      a. Solid color: Select from manufacturer's standard range.
   6. Tactile Lettering and Graphics Color Options: Select from manufacturer's standard colors.
   7. Overall panel size: As shown on Drawings.
   8. Shape: As shown on Drawings.
   9. Letter style, color, letter size and layout position: As shown on Drawings.
   10. Text schedule: Verify correct capitalization.

B. Graphic Style: Handicapped type.

2.3 ACCESSORIES

A. Tape Adhesive: Double sided tape, permanent adhesive.

B. Backing plate: provide solid color acrylic backing plate on opposite side of glazing mounted signs to conceal sign mounting tape.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

3.2 INSTALLATION

A. Install signs after surfaces are finished, in locations indicated on Drawings.

B. Center sign on door surface, level.

C. Position sign centered 6 inches from strike side of door; on wall surface, level. Sign shall be located 60 inches AFF measured to top of sign. Where no wall space exists on the latch side of doors, mount sing on the nearest adjacent wall. Obtain Architect approval of non-standard sign location prior to installation.

END OF SECTION

SECTION 10 28 00

TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes toilet accessories; shower and tub accessories.

B. Related Sections:
   1. Section 06 10 00 – Rough Carpentry: In-wall framing and plates for support of accessories.

1.2 REFERENCES

A. ASTM International:
   1. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
   2. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
   3. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
   4. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   5. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
   6. ASTM C1036 - Standard Specification for Flat Glass.

1.3 DESIGN REQUIREMENTS

A. Design grab bars, shower seats and attachments to resist minimum 250 lb concentrated load applied at any point in any direction.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit data on accessories describing size, finish, details of function, attachment methods.

C. Manufacturer's Installation Instructions: Submit special procedures, conditions requiring special attention.

1.5 REGULATORY REQUIREMENTS

A. Toilet accessories shall conform with American w/Disabilities Act requirements and ANSI A117.1 Accessible and Usable Buildings and Facilities requirements. ADA and ANSI A117.1 requirements shall supercede technical specifications of this section.

1.6 QUALITY ASSURANCE

A. Flame Resistant Fabric: Passes when tested in accordance with NFPA 701, Test 1 or Test 2.

1.7 COORDINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Coordinate the Work with placement of internal wall reinforcement to receive anchor attachments.

PART 2 PRODUCTS

2.1 TOILET AND BATH ACCESSORIES

A. Manufacturers:
1. American Specialties, Inc.
2. Bobrick.
3. Bradley Corp.
4. Or equal

2.2 COMPONENTS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
1. Grind welded joints smooth.
2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.

B. Keys: Furnish 2 keys for each accessory to Owner; master key accessories.

C. Stainless Steel Sheet: ASTM A666 Type 304.

D. Stainless Steel Tubing: ASTM A269, Type 304 stainless steel.

E. Galvanized Sheet Steel: ASTM A653/A653M, G90 zinc coating.

F. Mirror Glass (Type MR-F): ASTM C1036, Type 1 transparent flat, Class 1 clear, Quality Q1 mirror select; type with copper and silver coating, and organic overcoating.

G. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof.

H. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

2.3 TOILET ROOM ACCESSORIES

A. Toilet Tissue Dispenser (TTD): Surface mounted single roll toilet tissue dispenser of chrome plated cast brass. Equal to Bradley Model 508.

B. Soap Dispenser (SD): Surface mounted liquid soap dispenser fabricated of 20 guage satin finish stainless steel. Dispenser shall have completely concealed mounting, vandal-resistant filler hole cover and sight gauge. Push-in corrosion-resistant liquid soap valve operating with less than 5 lbs. of force. Capacity: 40 oz. liquid soap. Equal to Bradley Model 6562.

C. Mirrors (MIR): Mirror shall be 18" x 30" size and shall be framed with heavy-gauge, one piece roll-formed stainless steel angle 3/4" x 3/4" with corners heliarc welded and ground smooth to a satin finish. Double strength continuous integral stiffener on all sides for added strength. Bevel on front of angle secures frame flush against mirror. Back shall be fabricated of 20-gauge galvanized

steel, secured to frame with concealed screws, equipped with integral horizontal hanging brackets. Mirror shall be first quality 1/4" float glass protected by a shock absorbing neoprene tubing. Wall hanger shall be cold rolled 18 gauge steel. Equal to Bradley Model 780.

D. Grab Bars (BFGB): 1-1/2" O.D. concealed mounting heavy duty stainless steel grab bar with safety-grip peened finish stainless steel in sizes and configurations shown. Mounting flanges shall be fabricated of type 304, 11 gauge stainless steel and shall be 3-1/8" diameter. Escutcheons shall be fabricated of type 304, 22 gauge stainless steel, one piece drawn construction with exposed surfaces in architectural satin finish. Escutcheons shall snap securely over mounting flange. Grab bars shall be fabricated from type 304, 18 gauge stainless steel, seamless construction. Bent ends of tubing shall pass through flanges and be heliarc welded to form a single structural unit. Where required, intermediate supports shall be contour cut and joined by heliarc welding to form an integral part of the grab bar. All welds to be ground and finished to match adjacent finish.
   1. Grab Bars at Water Closets: Bradley Model 8120-0013600 (rear wall), Model 8120-0014200 (side wall horizontal), and Model 8120-0011800 (side wall vertical).
   2. Grab Bars at Shower: Bradley Model 8120-0593030 (control wall and sidewall horizontal) and Model 8120-0011800 (control wall vertical).

E. Feminine Napkin Disposal (FND): Surface-mounted sanitary napkin disposal shall be type-304 22 gauge stainless steel with all-welded construction; exposed surfaces shall have satin finish. Cover shall be fabricated of type 304 22 gauge stainless steel and secured to container with a full-length stainless steel piano-hinge. Cover shall have integral finger tab for opening cover. Equal to Bradley Model 4781-15.

F. Electrical Hand Dryer (EHD): Surface-mounted hand dryer shall protrude 4 inches, fabricated from stainless steel. Universal voltage capability. Dryer shall activate by means of an infrared emitting/receiving electronic control device, automatically detecting hands when present. Hand dryer shall be guaranteed against defects in material and/or workmanship for 5 years. Equal to Bradley Model 2899-74.

2.4 SHOWER AND TUB ACCESSORIES

A. Shower Curtain Rod/Curtain/Hooks (SCR): Concealed mounted shower curtain rod shall be fabricated of type 304 (18-8), 18 gauge stainless steel of seamless construction. Mounting flanges shall be of glass polypropylene with snap-on vandal-resistant protective escutcheons. Equal to Bradley Model 9538-36. Shower curtain shall be 6 gauge vinyl material with hemmed top edges and aluminum grommets at 6 inch centers. Equal to Bradley Model 9533-36. Provide required number of shower curtain hooks, stainless steel spring wire with snap fastener. Equal to Bradley Model 9536.

B. Folding Shower Seat (FSS): Reversible folding white phenolic shower seat shall be fabricated of 1/2 inch thick phenolic with Melamine bonded to its phenolic core. Secured to the frame of 18 gauge, 1” diameter tubing, and 16 gauge u-channel. Support leg contained in 16 gauge lower support bracket. Frame, mounting flanges, and lower support bracket fabricated from Type 304 stainless steel. Equal to Bradley Model 9569.

C. Robe/Towel Hook (RT/H): Surface mounted, fabricated of type 304, heavy gauge No. 4 satin finish stainless steel with concealed mount. Equal to Bradley Model 9314.

2.5 FACTORY FINISHING

A. Stainless Steel: No. 4 satin brushed, unless otherwise noted.

B. Galvanizing: ASTM A123/A123M; hot dip galvanize after fabrication.

C. Galvanizing for Nuts, Bolts and Washers: ASTM A153/A153M.

D. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.

E. Back paint components where contact is made with building finishes to prevent electrolysis.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify exact location of accessories for installation.

C. Verify field measurements are as indicated on product data.

D. See Section 06 10 00 for installation of blocking and reinforcing plates in walls.

3.2 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.3 EXISTING WORK

A. Clean and repair existing toilet accessories which remain or are to be reinstalled.

3.4 INSTALLATION

A. Install accessories in accordance with manufacturer’s instructions.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights and Locations: As required by accessibility regulatory requirements.

END OF SECTION

SECTION 10 73 13

AWNINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes metal framing and fittings; fabric covering; and applied.

B. Related Sections:
1. Section 06 10 00 – Rough Carpentry: Wood blocking and grounds for support and anchorage of awning framing anchors.

1.2 REFERENCES

A. ASTM International:
1. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
2. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
4. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
5. ASTM B210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes.
6. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
7. ASTM B241/B241M - Standard Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube.
8. ASTM B483/B483M - Standard Specification for Aluminum and Aluminum-Alloy Drawn Tubes for General Purpose Applications.

B. National Fire Protection Association:
1. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

C. Underwriters Laboratories Inc.:
1. UL - Fire Protection Equipment Directory.

1.3 DESIGN REQUIREMENTS

A. Awning materials, assembly and attachments to resist minimum 5 psf uniform load plus snow, wind, suction, and uplift design loads required by ASCE 7 at any point without damage or permanent set.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Shop Drawings: Indicate awning profiles, sizes, connection attachments, anchorage, size and type of fasteners, graphic images, and accessories.

C. Product Data: Submit data on awning covering, color fastness, stitching and seaming methods, attachment devices to framing system.

D. Covering Samples: Submit sample of covering for selection.

1.5 QUALITY ASSURANCE

A. Flame Resistant Fabric: Passes when tested in accordance with NFPA 701, Test 1 or Test 2.

PART 2 PRODUCTS

2.1 AWNINGS

A. Manufacturers:
1. Advanced Awning Design.
2. Atlantic Systems & Awnings, Inc.
3. Awning & Supply Co.
4. Awnings Unlimited, Inc..
5. John Boyle & Co., Inc.
6. Eastern Awnings Systems, Inc.
7. Scatten Brothers Awning Manufacturing Co.
8. Or equal.

2.2 ALUMINUM FRAMING SYSTEM COMPONENTS

A. Framing: Aluminum, square, size as required to support imposed loads, tubing conforming to ASTM B210.

B. Fittings: Elbows, T-shapes, wall brackets; machined aluminum.

C. Mounting: Brackets and flanges, with aluminum brackets for mounting on wall construction.

D. Splice Connectors: Collar with locking set screws; machined aluminum.

E. Exposed Fasteners: Flush countersunk stainless steel screws or bolts; consistent with design of system.

F. Finish Exposed Components: Anodized; color as selected.

2.3 COVERING MATERIAL COMPONENTS

A. Vinyl Laminated Polyester: 16 oz/sq yd, resistant to ultra-violet light, mildew and water, flame resistant treated; color as selected.

2.4 FABRICATION - FRAMING

A. Fit and shop assemble components in largest practical sizes, for delivery to site.

B. Fabricate components with joints tightly fitted and secured.

C. Exposed Fastenings: Unobtrusively located; consistent with design of component, except where specifically noted otherwise.

D. Supply components required for anchorage of framing. Fabricate anchors and related components of same material and finish as framing, except where specifically noted otherwise.

E. Continuously seal joined pieces by continuous welds.

F. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

G. Accurately form components to suit each other and to building structure.

2.5 FABRICATION - COVERING

A. Manufacture covering in one piece wherever possible, sized and configured to suit framing.

B. Form covering heading of triple thickness 2 inches wide, double fold bottom hem 2 inches wide.

C. Prepare covering with attachment devices for attachment to framing 6 inches on center.

D. Turn seam edges and lock stitch.

E. Apply graphic images to design and colors indicated.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify wall substrate is acceptable and are ready to receive work.

3.2 INSTALLATION

A. Installation of Framing:
1. Install components plumb and level, accurately fitted, free from distortion or defects.
2. Provide anchors required for connecting framing to structure. Anchor framing to structure.
3. Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

B. Installation of Covering:
1. Install covering over framing members, stretched taught without creases or folds.
2. Attach covering and fasten securely.

3.3 ERECTION TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

C. Maximum Misalignment From Indicated Position: 1/4 inch.

3.4 ADJUSTING

A. Section 01 70 00 - Execution and Closeout Requirements: Testing, adjusting, and balancing.

B. Adjust awnings to produce uniform appearance and consistently in proper relation with adjacent work.

END OF SECTION

SECTION 13 40 00

BULLET RESISTANT FIBERGLASS COMPOSITE

PART 1 GENERAL

1.1 SUMMARY

A. Section includes bullet resistant fiberglass composite.

1.1 REFERENCES

A. Underwriters Laboratory
   1. UL 752 Bullet Resisting Equipment

B. ASTM International
   1. ASTM E119 – Standard Test Methods for Fire Test of Building Construction and Materials.

1.2 DESIGN REQUIREMENTS

A. Bullet resistant fiberglass composite shall be designed, manufactured and applied to be of the "non-ricochet type". This design is intended to permit the capture and retention of an attacking projectile lessening the potential of a random injury or lateral penetration.

1.3 PERFORMANCE REQUIREMENTS

A. The Bullet Resistant Fiberglass Composite panel(s) must be UL Listed rated for level 2.

1.4 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data: Submit catalog cuts, brochures, manufacturer’s specifications, and printed data in sufficient detail to indicate compliance with the contract documents and the manufacturer's instructions for the installation of Bullet Resistant Fiberglass Composite Panels.

C. Manufacturer's Installation Instructions.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

E. Submit proof of possession of Product Liability Insurance in an amount not less than Five Million U.S. Dollars.

1.5 QUALIFICATIONS

A. The fiberglass composite provider must be ISO 9001:2008 Certified with proof of certification from an accredited registrar.

B. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Requirements for transporting, handling, storing, and protecting products.

B. Deliver the materials to the project with the manufacturer's U. L. Labels intact and legible.

C. Handle the material with care to prevent damage.

D. Store the materials inside under cover, stack flat and off the floor.

1.7 WARRANTY

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for warranties.

B. All materials and workmanship shall be warranted against defects for a period of two (2) year from the date of receipt at the project site.

PART 2 PRODUCTS

2.1 BULLET RESISTANT FIBERGLASS COMPOSITE MATERIAL

A. The panels shall be made of multiple layers of woven roving ballistic grade fiberglass cloth impregnated with a thermoses polyester resin and compressed into flat rigid sheets.

B. The production technique and materials used shall provide the controlled internal delamination to permit the capture of a penetrating projectile.

C. Bullet Resistant fiberglass composite panels shall be ARMORTEX O. F. 200, as manufactured by ARMORTEX, Schertz, Texas 78154. Phone: (210)-661-8306, (800)-880-8306, Fax: (210)-661-8308. Unlisted bullet resistant composite products will not be considered acceptable or equal. If in compliance with all requirements of this specification products by these additional manufacturers are acceptable.
   1. Insulgard
   2. Chicago Bullet Proof
   3. CR Lawrence Co.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Verification of existing conditions before starting work.

B. Prior to installing the bullet resistive material the contractor shall verify that all supports have been installed as required by the contract documents and the architectural drawings.

3.2 INSTALLATION

A. Armor shall be installed in accordance with the manufacturer's printed recommendations.

B. Armor panels shall be adhered using industrial adhesive and screws. Method of application shall maintain the bullet resistive rating at junctures with the concrete floor slab, junction with panels at ceiling, bullet resistive door frames, and all required penetrations.

C. Joints:
   1. All joints shall be reinforced by a back-up layer of bullet resistive material. The bullet resistance of the joint, as reinforced, shall be at least equal to that of the panel. Minimum width of reinforcing layer at joint shall be 4" (2" on each panel or a 2" minimum overlap).

END OF SECTION

SECTION 22 0001

GENERAL PLUMBING REQUIREMENTS

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. This Division includes all labor, materials, equipment, tools, supervision, start-up services, Owner training, etc., including all incidental and related items, necessary to complete installation and successfully test and start up and operate the Plumbing systems indicated on the drawings, AND as described in each Section of Division 220000 Specifications.

B. All drawings and General Provisions of the Contract, including the General Conditions, Supplementary General Conditions, and Division 1 specification sections, apply to work of all Division 22 sections. The items in this section are not intended to supersede, but are supplementary to, the requirements set forth in other Divisions of the specifications.

C. The Contractor, and his Subcontractors and Suppliers, shall include in his bid all materials, labor, and equipment involved, in accordance with all local customs, codes, rules, regulations; and secure compliance of all parts of the Specifications and Drawings regardless of Sectional inclusion in these Specifications.

D. The CONTRACTOR shall be held responsible for the complete and satisfactory accomplishment of all Work inclusive of whatever miscellaneous material and/or appurtenances are required to perfect the installation, and demonstrate that all electrical systems will operate satisfactorily under normal operating conditions.

1.02 DRAWINGS

A. The drawings are diagrammatic and show the general location and arrangement of equipment, piping and related items. They shall be followed as closely as elements of the construction will permit. The Contractor shall provide/install all plumbing systems, and associated equipment, complete and include all necessary offsets, fittings, and other components required due to interferences, space constraints, code requirements, etc. as required to provide a complete/functional system.

B. The general plumbing requirements are intended to augment the drawings and specifications. Should conflicts occur between the drawings and the specifications, the strictest provision shall govern. Where there are conflicts or differences between the drawings for the various trades, report such conflicts or differences to the ARCHITECT and/or ENGINEER for resolution.

C. The CONTRACTOR shall examine the drawings of all other trades in order to verify the conditions governing the work on the job site. Arrange work accordingly, providing all piping, fittings, traps, valves and accessories as may be required to meet such conditions.

D. Deviations from the drawings, with the exception of minor changes in routing and other such incidental changes that do not affect the functioning or serviceability of the systems, shall not be made without the written approval of the ARCHITECT and/or ENGINEER.

E. The architectural and structural drawings take precedence in all matters pertaining to the building structure, plumbing drawings in all matters pertaining to plumbing trades and electrical drawings in all matters pertaining to electrical trades. Where there are conflicts or differences between the drawings for the various trades, report such conflicts or differences to the ARCHITECT and/or ENGINEER for resolution.

1.03 COORDINATION OF WORK

A. The CONTRACTOR and his Subcontractors shall be responsible for all tasks applicable to their work in accordance with the Specifications, Drawings, and code requirements, and shall be

responsible for coordinating locations and arrangements of their work to give best results with all other relevant trades.

1. Coordinate his work to obtain symmetry in ceiling layouts, so that sprinkler heads, lights, diffusers, etc. are coordinated and are installed per the Architectural reflected ceiling plan.
2. Coordinate all wall, roof, floor penetrations, equipment pads, etc. with architectural and structural trades.
3. Refer to architectural floor plans for exact locations/heights of fixtures (standard and barrier free), sinks, toilets, lavatories, water coolers, etc. Coordinate with architectural plans for details on casework, furniture, etc.
4. Verify requirements of all equipment with shop drawing submittals prior to installation - notify Architect/Engineer of any conflicts between shop drawings and plans.
5. Coordinate locations of plumbing items that require access (i.e. isolation valves, balance valves, etc.) with reflected ceiling plan. Items located above hard non-accessible ceilings shall be provided with access doors as required.
6. Do not route/locate below grade piping below, or with 45 degrees of the bottom corner of, foundation walls/footings. Coordinate with structural trades prior to installing piping.
7. Verify clearance requirements of all electrical and mechanical equipment/systems prior to the installation of any new work. Plumbing equipment, piping, systems, etc. shall not interfere with electrical equipment spaces. Electrical conduit and equipment clearances shall not interfere with mechanical equipment spaces.

1.04 INSPECTION OF SITE AND PROJECT DOCUMENTATION

A. The CONTRACTOR shall visit the site and examine/verify the conditions under which the work must be conducted before submitting proposal. The CONTRACTOR shall examine the drawings and specifications of all other trades including Mechanical, Architectural, Structural and Electrical.

B. The submitting of a proposal implies that the CONTRACTOR has visited the site, examined all contract documents, and understands the conditions under which the work must be conducted.

C. The CONTRACTOR shall notify the ARCHITECT and/or ENGINEER, prior to submitting his bid via Request For Information (RFI), of any potential problems that he has identified during his inspection of the site or from the review of plans/specifications. RFIs must be submitted at least 5 working days prior to bid opening.

1.05 GENERAL SUPPORT REQUIREMENTS

A. Provide all necessary angle/brackets, hangers, or supplementary supporting steel as required for adequate support for all piping, ductwork, and equipment. Secure approval from Architect and/or Structural Engineer, in writing, before welding or bolting to steel framing or anchoring to concrete structure, or cutting/coring thru structural systems

B. Where piping or equipment is supported or suspended from concrete construction, provide approved concrete inserts in formwork to receive hanger rods, such as Unistrut or Powerstrut, and where installed in metal deck, use Ramset or Welds as required.

C. Install plumbing piping systems with adequate anchors, guides, expansion loops, etc. as required to provide for piping expansion/contraction.

1.06 GUARANTEE

A. CONTRACTOR shall guarantee that all labor, materials, and equipment are free from defects and agrees to replace or repair any part of this installation which becomes defective within a period of one year from the date of substantial completion following final acceptance. Acceptance date of substantial completion shall be as determined by the ARCHITECT and/or

ENGINEER.

B. The CONTRACTOR shall file with the OWNER any and all guarantees from the equipment manufacturers including the operating conditions and performance capacities they are based on.

1.07 CODES, PERMITS AND FEES

A. Refer to Division 1, General Conditions and Supplementary Conditions.

B. Unless otherwise indicated, all required permits, plan reviews, licenses, inspections, approvals and fees for mechanical work shall be secured and paid for by the CONTRACTOR.

C. All work shall be executed in accordance with the latest enforceable rules and regulations set forth in local and state codes.

1. Mechanical and Plumbing systems shall be installed per the Owner's current jurisdictional codes (Michigan Mechanical Code, Michigan Plumbing Code, International Fuel Gas Code, etc.), current NFPA codes (NFPA 101, NPFA 90, etc.), and applicable sections of the Michigan Building Code. Coordinate Owner's current codes with Owner's representative prior to work.

D. In the event that the plans and specifications conflict with any rules, regulations, or codes applying, said rules, regulations and codes shall govern.

E. Where the drawings and/or specifications indicate materials or construction in excess of code requirements, the drawings and/or specifications shall govern.

1.08 UTILITIES

A. The CONTRACTOR shall be responsible for coordinating new services and/or modifications to existing services, with the Owner, Owner's representative, and the utility company(s) for the natural gas service modifications.

B. Rules of local utility companies shall be complied with. The CONTRACTOR shall check with each utility company supplying service to the installation (i.e. water, gas, sewer, storm, etc.) and coordinate service requirements including, but not limited to, all valves, regulators, meters, etc. which will be required. The Owner shall be responsible for paying any utility company charges.

C. In the event that the plans and specifications conflict with any utility rules, regulations, or codes applying, said utility rules, regulations and codes shall govern.

1.09 SUBSTITUTION ITEMS REQUIRING PRIOR APPROVAL

A. All items that the CONTRACTOR proposes to use in the work that are not specifically named in the contract documents must be submitted for review. Such items must be submitted to the ARCHITECT and/or ENGINEER for approval a minimum of ten (10) days prior to bid opening. Requests for prior approval must be accompanied by complete catalog information, including but not limited to, model, size, accessories, complete electrical information and performance data in the form given in the equipment schedule on the drawings at stated design conditions. Where items are referred to by symbolic designations on the drawings, all requests for prior approval shall bear the same designations.

1.10 MATERIAL AND EQUIPMENT MANUFACTURERS

A. All items of equipment shall be furnished complete with all accessories normally supplied with the catalog items listed and all other accessories necessary for a complete and satisfactory operating system. All equipment and materials shall be new and shall be standard products of manufacturers regularly engaged in the production of plumbing, heating, ventilating and air conditioning equipment and shall be the manufacturer's latest design.

B. If an approved manufacturer is other than the manufacturer used as the basis for design, the equipment of product provided shall be equal in quality, durability, appearance, capacity and efficiency through all ranges of operation, shall conform with arrangements and space limitations

of the equipment shown on the plans and/or specified, shall be compatible with the other components of the system and shall comply with the requirements for Substitution Items Requiring Prior Approval specified in this Section of the Specifications. All costs to make these items of equipment comply with these requirements including, but not limited to, piping, sheet metal, electrical work, and building alterations shall be included in the original bid.

C. All package unit skid mounted equipment that are factory assembled shall meet, in detail, the products named and specified within each section of the detailed mechanical and electrical specifications.

1.11 OPERATION AND MAINTENANCE INSTRUCTIONAL MANUALS

A. Provide compete maintenance and operating instructional manuals covering all plumbing equipment as specified herein, Division 1 requirements, and individual equipment specification sections.

B. The O&M data shall be bound in a suitable number of 3" or 4", 3-ring, hard cover binders. Permanently imprinted on the cover shall be the words, "Manufacturer's Operation and Maintenance Data", project title, location of project, and the date. A table of contents shall be provided in the front of each binder.

C. Maintenance and operating instructional manuals shall be job specific to this project. Generic manuals are not acceptable. Each piece of equipment in the O&M manual shall be identified as identified on the project drawings (i.e. Water Closet WC-1, Lavatory LAV-1, etc.).

D. Internally subdivide the binder contents with permanent page dividers, organized by major equipment/systems (i.e. Plumbing Equipment, Plumbing Fixtures, Plumbing Specialties, etc.).

E. Contents: Each volume of O&M manual shall have three parts:

1. Part 1: A directory listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: O&M data, arranged and subdivided by major equipment/systems. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers:

   a. List of equipment.

   b. Copies of Shop drawings and product data, approved by Architect/Engineer.

   c. Installation and operational procedures.

   d. Routine maintenance procedures.

   e. Trouble shooting procedures.

   f. Complete parts lists by nomenclature, manufacturer's part number and use.

   g. Recommended spare parts lists.

   h. Lubrication chart listing all types of lubricants to be used for each piece of equipment and the recommended frequency of lubrication.

   i. Complete wiring and schematic diagrams.

   j. Elevations and/or sections cut through all of the major equipment and sub-assemblies.

3. Part 3: Project documents and certificates, including the following:

   a. Warranty Certificates.

   b. Copies of approved construction permits.

F. Maintenance and Operating manuals shall be provided to the ARCHITECT and/or ENGINEER for review when construction is 75% complete.

G. A minimum of two (2) copies of all approved Operation and Maintenance literature shall be furnished to the OWNER within 10 days after final inspection. O&M manuals must be completed prior to start of OWNER training as the manuals shall be used as the basis of the training.

1.12 SHOP DRAWINGS/SUBMITTALS

A. Refer to General Conditions and Supplementary General Conditions.

B. All shop drawings shall be submitted in groupings of similar and/or related items. Incomplete submittal groupings will be returned unchecked.

C. Submit fire protection system shop drawings, product data and hydraulic calculations to local authorities having jurisdiction, the OWNER'S insuring agency, and the ARCHITECT and/or ENGINEER for approval prior to fabrication or installation. Submit proof of approval to ARCHITECT and/or ENGINEER.

D. Unless noted otherwise, submit digital (.pdf format) copies of complete manufacturer's shop drawings for all plumbing equipment, valves, specialties, wiring diagrams and control diagrams including, but not limited to the items listed below. Where items are referred to by symbolic designation on the drawings and specifications, all submittals shall bear the same designation. Refer to other Sections of the plumbing specifications for additional requirements.

1. Electric Water Coolers
2. Plumbing Specialties
3. Plumbing Equipment
4. Plumbing Fixtures

1.13 INSTRUCTION OF OWNER PERSONNEL

A. Before final inspection the CONTRACTOR shall instruct OWNER's designated personnel in operation, adjustment and maintenance of plumbing equipment and systems at agreed upon times.

B. For equipment requiring seasonal operation, perform instructions for other seasons within six months.

C. Use Operation and Maintenance Manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

D. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

1.14 RECORD DRAWINGS

A. The CONTRACTOR shall keep accurate notes of all deviations from the construction documents and discrepancies of construction on field drawings as they occur. The marked up field documents shall be available for review by the ARCHITECT and/or ENGINEER, and OWNER at their request.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 INSTALLATION OF EQUIPMENT

A. Install equipment in strict accordance with all directions and recommendations furnished by the manufacturer. Where such directions are in conflict with the drawings and specifications, report such conflicts to the ARCHITECT and/or ENGINEER for resolution.

3.02 DEMOLITION WORK

A. All demolition of existing plumbing equipment and materials shall be done by the Contractor unless otherwise indicated. Included are all items such as, but not limited to, existing piping, pumps, supports and equipment where such items are not required for the proper operation of the modified system.

B. In general, demolition work is indicated on the drawings. However, the Contractor shall visit the job to determine the full extent and character of this work.

C. Unless specifically noted to the contrary, removed materials shall not be reused in the work. Salvaged materials that are to be reused shall be stored safe against damage and turned over to the appropriate trade for reuse. Salvaged materials of value that are not to be reused shall remain the property of the Owner unless such ownership is waived. Remove items from the systems and turn over to the Owner in their condition prior to removal. The Owner shall move and store these materials. Items on which the Owner waives ownership shall become the property of the Contractor, who shall remove and legally dispose of, away from the premises.

D. Work that has been cut or partially removed shall be protected against damage until covered by permanent construction.

E. Clean and flush the interior and exterior of all existing relocated equipment and its related piping, valves, and accessories that are to be reused of all mud, debris, pipe dope, oils, welding slag, loose mill scale, rust and other extraneous material so that the existing equipment and all accessories can be repainted and repaired as required to place in first-class working condition.

F. Where existing equipment is to be removed, cap piping under floor, behind face of wall, above ceiling or at mains.

3.03 WORK IN EXISTING BUILDINGS

A. The Owner will provide access to existing buildings as required. Access requirements to occupied buildings shall be identified on the project schedule. The Contractor, once work is started in the existing building, shall complete same without interruption so as to return work areas as soon as possible to Owner.

B. Adequately protect and preserve all existing and newly installed work. Promptly repair any damage to same at Contractor's expense.

C. Consult with the ARCHITECT and/or ENGINEER as to the methods of carrying on the work so as not to interfere with the Owner’s operation any more than absolutely necessary. Accordingly, all service lines shall be kept in operation as long as possible and the services shall only be interrupted at such time as will be designated by the Architect and/or Owner's Representative.

3.04 WORK INVOLVING OTHER TRADES

A. Certain items of equipment or materials specified in the Plumbing Division may have to be installed by other trades due to code requirements or union jurisdictional requirements. In such instances, the Contractor shall complete the work through an approved, qualified subcontractor and shall include the full cost for same in his bid.

3.05 COORDINATION

A. Install work to avoid interference with work of other trades including, but not limited to, architectural and electrical trades. Remove and relocate any work that causes an interference at CONTRACTOR's expense. Disputes regarding the cause of an interference shall be resolved by the ARCHITECT and/or ENGINEER.

3.06 CHASE, SHAFTS AND RECESSES

A. Coordinate with structural, architectural and other trades to ensure accurate location and size of chases, shafts and recesses required for plumbing systems/piping.

3.07 SLEEVES

A. Provide and install Schedule 40 black steel pipe sleeves, cut to length, wherever pipes pass through above grade walls and floors. Provide and install galvanized steel pipe sleeves, cut to length, wherever pipes pass through below grade foundation walls and slab on grade floors. Sleeves shall terminate flush with walls in finished areas. All sleeves through the floor are to extend two (2) inches above finish floor.

B. Provide escutcheons at each penetration through walls, floors, and ceilings in exposed areas.

C. Patch sleeves to match building material.

3.08 SEALING OF PLUMBING OPENINGS

A. Seal the space around pipes and sleeves through walls, floors and ceilings.

B. Provide adequate clearance to allow for proper pipe movement and sealing.

C. Provide/install fireproof wall and floor sleeves as required by applicable building codes at all applicable wall, ceiling, and floor penetrations. Refer to Architectural plans for wall assembly ratings.

D. Sleeves placed in floors shall be flush with the underside of the floor construction and shall have planed, square ends, extending 2 inches above the finished floor, unless otherwise noted or detailed.

E. Where sleeves pass through reinforced concrete floors, they shall be properly set in position prior to concrete pouring in such a way that they will be maintained in position until the concrete is set.

F. Pipes passing through below grade perimeter walls or slabs on grade shall have the space between the pipe and sleeve sealed watertight with a mechanically expandable elastomer seal device.

G. Penetrations through fire rated floors and walls shall be firestopped in accordance with applicable building code requirements with UL and FMRC approved materials and shall have a fire rating equal to or greater than the fire partition rating. Refer to architectural plans for locations and assembly ratings.

1. Packing: Refractory fiber or ceramic fiber.
   a. Manufacturers:
      1) Carborundum Fiberfrax.
      2) Johns-Manville - Cerafelt.
      3) Eagle Picher Epitherm 1200.
      4) Babcock and Wilcox Kaowool.
2. Fire stop sealant.
   a. Manufacturers:
      1) Hilti
      2) Tremco
      3) Mameco
      4) Pecora
3. For polypropylene (Acid Waste/Acid Vent piping) penetrations through fire rated assemblies, provide an intumescent firestop.
   a. Hilti CP 642 Firestop Collar.

b. Hilti FS-ONE High Performance Intumescent Firestop Sealant.

c. 3M Fire Barrier PPD Plastic Pipe Device.

d. 3M Fire Barrier Intumescent Firestop Sealant.

4. Where combustible pipes, tubes, vents, etc. penetrate a fire rated assembly, such penetrations shall be protected by an approved through-penetration fire stop collar/sealant system per the building code.

a. Through -penetration firestop systems shall be tested in accordance with ASTM E814 with a minimum positive pressure differential of 0.01 inch WG. Through penetration firestop systems shall have a "F" rating and a "T" rating of not less than 1 hour but not less than the required rating of the assembly penetrated.

b. Hilti CP 642 Firestop Collar.

c. Hilti FS-ONE High Performance Intumescent Firestop Sealant.

d. 3M Fire Barrier PPD Plastic Pipe Device.

e. 3M Fire Barrier Intumescent Firestop Sealant.

3.09 CUTTING, CORING AND PATCHING

A. Refer to General Conditions

B. The CONTRACTOR shall perform all cutting, coring, and patching that may be necessary for the installation of their Work. All cutting, coring, patching and repair work shall be performed by the CONTRACTOR through qualified Subcontractors. CONTRACTOR shall include full cost of same in his bid.

C. Secure approval form Architect and/or Structural Engineer, in writing, before cutting, welding/bolting to, or anchoring from any structural building components (i.e. structural steel, load bearing walls, footings/foundations, concrete floors/ceilings, etc.).

3.10 EXCAVATION AND BACKFILLING

A. Provide all excavation, trenching, tunneling and backfilling required for the plumbing work.

B. Provide foundations if required to support underground piping.

C. Refer to Architectural/Structural specification sections for excavation and backfilling details.

3.11 EQUIPMENT FOUNDATIONS AND SUPPORTS

A. Shall be as required or as shown on plans or specified.

B. For equipment suspended form ceiling or walls, furnish and install all inserts, rods, structural steel frames, brackets and platforms required. Obtain approval of ARCHITECT and/or ENGINEER for same including loads, locations, and methods of attachment.

3.12 EQUIPMENT CONNECTIONS

A. Make connections to equipment, fixtures and other items included in the work in accordance with the approved shop drawings and rough-in measurements furnished by the manufactures of the particular equipment furnished.

B. All piping connections to equipment shall be flanged or shall be made with unions to facilitate equipment removal.

C. All piping connections to pumps, coils, and other equipment shall be installed without strain at the pipe connection of this equipment.

D. Brass unions for connections of 2 inch and less and flanged union with dielectric gasket and bolt sleeves for 2-1/2 inch and greater shall be used for equipment connections of dissimilar metals.

3.13 ACCESSIBILITY

A. All equipment shall be installed so as to be readily accessible for operation, maintenance, and repair, as required by the equipment manufacturer and as subject to the approval of the ENGINEER.

3.14 ACCESS DOORS

A. The CONTRACTOR, and/or his Subcontractors, shall provide access doors for access to any of their respective plumbing equipment (i.e. valves, controls, equipment, etc.) that is installed in inaccessible areas. Provide access doors in the walls, as required to make all electrical boxes, controls and other equipment installed by the CONTRACTOR accessible. In the walls, provide Milcor No. "DW" or "M" as required to make all equipment installed by the CONTRACTOR accessible. Minimum size 12 inches x 12 inches. In the ceiling, provide Milcor N. 3210, 3105 or 3206 for accessibility as mentioned above, 24 inches x 24 inches minimum size. The plaster or acoustical tile insert shall be by the architectural trades. Areas with accessible ceilings (ceilings where tiles are not fastened in place and can be individually removed without removal of adjacent tiles) will not require access doors.

B. Refer to Architectural specifications for manufacturer's and model numbers and additional information.

C. The CONTRACTOR, and/or his Subcontractors, shall be responsible for quantities of access doors and shall receive approval for locations from the ARCHITECT and/or ENGINEER prior to installation.

D. The CONTRACTOR, and/or his Subcontractors, shall purchase appropriate access doors, coordinate locations, and shall pay for installation by a qualified architectural subcontractor.

E. When access doors are in fire resistant walls or ceilings, they must bear the Underwriters' Laboratories, Inc., Label, with time design rating equal to or exceeding that of the wall or ceiling unless they were a part of the tested assembly.

3.15 CLEANING

A. Each trade shall be responsible for removing all debris daily as required to maintain the work area in a neat, orderly condition.

B. After equipment and systems have been completed and tested, each entire system shall be cleaned and flushed.

C. Prior to connection of new piping to existing piping systems, all new piping shall be subject to initial flushing, cleaning and final flushing. Provide temporary bypass piping and fittings, temporary valves and strainers, temporary water make-up piping with approved means of backflow prevention, and temporary pumps as needed to perform specified flushing and cleaning requirements.

3.16 PAINTING

A. All plumbing systems, equipment, piping, etc. exposed in finished areas shall be painted to match the surrounding finishes. Refer to specification section 09900 - Coordinate color with Architect.

3.17 PROTECTION AND HANDLING OF EQUIPMENT AND MATERIALS

A. Electrical equipment furnished by Plumbing Trades and installed by Electrical Trades shall be turned over to Electrical Trades in good condition.

B. Equipment and materials shall be protected from theft, injury or damage.

C. Materials with enamel or glaze surface, shall be protected from damage by covering and/or coating as recommended in bulletin, "Handling and Care of Enameled Cast Iron Plumbing Fixtures," issued by the Plumbing Fixtures Manufacturers Association, and as approved.

D. Coat polished or plated metal parts with white petroleum jelly immediately after installation.

E. Protect equipment outlets, pipe openings with temporary plugs or caps.

F. Provide adequate storage for all equipment and materials delivered to the job site. Equipment set in place in unprotected areas must be provided with temporary protection.

3.18 GENERAL SUPPORT REQUIREMENTS

A. Each trade shall provide all required supporting components to properly support their work. Supporting components/systems shall be in accordance with Code and as specified.

B. Provide all necessary angle/brackets or supplementary steel as required for adequate support for all piping, ductwork, specialties, and equipment. Secure approval form ARCHITECT and/or Structural ENGINEER, in writing, before welding or bolting to steel framing or anchoring to concrete structure.

C. Where piping, specialties, or equipment is supported or suspended from concrete construction, provide approved concrete inserts in formwork to receive hanger rods, such as Unistrut or Powerstrut, and where installed in metal deck, use Ramset or Welds as required.

3.19 PIPING INSTALLATION IN PLENUM SPACES

A. Pipe and pipe fittings installed in mechanical air plenum spaces shall of non-combustible materials. If PVC piping is specified as an approved material, it shall be wrapped with at least 1.5 inches of non-combustible insulation plus continuous vapor barrier which meet building code required smoke and flame spread ratings.

B. Coordinate location of mechanical plenum spaces with electrical trades for plenum rated cable requirements.

3.20 DRAWINGS AND MEASUREMENTS

A. These specifications and accompanying drawings are intended to describe and provide for finished work. They are intended to be cooperative, and what is called for by either the drawings or specifications shall be as binding as if call for by both. The work herein described shall be complete in every detail.

B. The Drawings are not intended to be scaled for rough-in measurements, nor to serve as Shop Drawings. Field measurements necessary for ordering materials and fitting the installation to the building construction and arrangement shall be taken by the Contractor. The Contractor shall check latest architectural drawings to locate equipment/fixtures/etc., check latest structural drawings for interferences, etc..

3.21 PIPING SYSTEMS TESTING

A. Test drainage piping systems in accordance with their respective and applicable governing codes. Test drainage and waste piping hydraulically by filling the system to its highest point or at a static head of 10 feet, whichever is higher.

B. Pressure test plumbing piping (domestic cold water, domestic hot water, hot water recirculation, etc.) in accordance with governing and applicable codes. At minimum, test with water at 225 PSIG - permissible pressure drop shall be 0 PSIG over 2 hour period.

C. Pressure test natural gas and propane gas piping in accordance with governing and applicable codes. At minimum, test with air at 100 PSIG - permissible pressure drop shall be 0 PSIG over 2 hour period.

3.22 EXTRA WORK

A. For any extra work which may be proposed, the Contractor shall furnish to the General Contractor/Construction Manager, an itemized breakdown of the estimated cost of all materials and labor required to complete this work. The estimate cost breakdown shall include unit prices (same prices for increase/decrease of work) for all materials (i.e. duct, piping, valves, equipment,

equipment rental, etc.) and all labor (i.e. manhours, overtime, etc.) which may be required for any proposed extra work. The Contractor shall not proceed until receiving a written order from the General Contractor establishing the agreed price and describing the work to be done.

END OF SECTION

SECTION 22 0719

PLUMBING PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping insulation.

B. Jackets and accessories.

1.02 REFERENCE STANDARDS

A. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

B. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric].

C. ASTM C 177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot Plate Apparatus.

D. ASTM C 195 - Standard Specification for Mineral Fiber Thermal Insulating Cement.

E. ASTM C 449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement.

F. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

G. ASTM C 533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation.

H. ASTM C 534/C 534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.

I. ASTM C 547 - Standard Specification for Mineral Fiber Pipe Insulation.

J. ASTM C 795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.

K. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

L. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials.

M. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association.

N. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc..

1.03 SUBMITTALS

A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

B. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than 10 years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 10 years of experience.

C. Where insulation and covering is specified or required to include a vapor barrier, it is critical that the integrity of the vapor barrier is maintained. Do not use fasteners that may unintentionally penetrate the vapor barrier. Where fasteners must penetrate the vapor barrier, the vapor barrier shall be repaired with a patch or tape of the same material.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

B. Store insulation in original wrapping and protect from weather, dirt, chemicals, and damage.

1.06 FIELD CONDITIONS

A. Maintain ambient conditions required by manufacturers of each product.

B. Maintain temperature before, during, and after installation for minimum of 24 hours.

1.07 INSULATION OF EXISTING SYSTEMS

A. On renovation/addition projects where existing piping systems are being modified the existing piping systems shall be reinsulated as required to maintain sealed insulation/vapor barrier.

B. After completion of any required asbestos abatement, reinsulate all existing systems.

PART 2 PRODUCTS

2.01 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E 84, NFPA 255, or UL 723.

B. Where insulation and covering is specified or required to include a vapor barrier, it is critical that the integrity of the vapor barrier is continuously maintained. Fasteners or other securing devices that may unintentionally penetrate, or damage, the vapor barrier are prohibited. Where fasteners must penetrate the vapor barrier, the vapor barrier shall be repaired.

2.02 GLASS FIBER

A. Manufacturers:

1. Knauf Insulation: www.knaufusa.com.
2. Johns Manville Corporation: www.jm.com.
3. Owens Corning Corp: www.owenscorning.com.
4. CertainTeed Corporation: www.certainteed.com.

B. Insulation: ASTM C 547 and ASTM C 795; rigid molded, noncombustible.

1. 'K' value: ASTM C 177, 0.24 at 75 degrees F.
2. Maximum service temperature: 850 degrees F.
3. Maximum moisture absorption: 0.2 percent by volume.
4. Density: 3.5 lb./cu. ft.

C. Vapor Barrier Jacket: White kraft paper with glass fiber yarn, bonded to aluminized film; moisture vapor transmission when tested in accordance with ASTM E 96 of 0.02 perm-inches. Secure with self-sealing longitudinal laps and butt strips.

D. Tie Wire: 0.048 inch stainless steel with twisted ends on maximum 12 inch centers.

E. Vapor Barrier Lap Adhesive:

1. Compatible with insulation as recommended by insulation manufacturer.

F. Insulating Cement/Mastic:

1. ASTM C 195; hydraulic setting on mineral wool.

G. Fibrous Glass Fabric:

1. Cloth: Untreated; 9 oz./sq. yd. weight.
2. Blanket: 1.0 lb./cu ft. density.

H. Indoor Vapor Barrier Finish:

1. Vinyl emulsion type acrylic, compatible with insulation, white color.

I. Outdoor Vapor Barrier Mastic:

1. Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.

J. Outdoor Breather Mastic:

1. Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.

K. Insulating Cement:

1. ASTM C 449/C 449M.

2.04 FLEXIBLE ELASTOMERIC CELLULAR INSULATION (CELLULAR FOAM)

A. Manufacturer:

1. Armacell International: www.armacell.com.
2. Armstrong "AP Armaflex".
3. Rubatex Corp.

B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C 534 Grade 3; use molded tubular material wherever possible. Insulation shall not be used on stainless steel.

1. K Value: ASTM C177 or C518; 0.27 at 75 degrees F.
2. Minimum Service Temperature: -40 degrees F.
3. Maximum Service Temperature: 220 degrees F.
4. Maximum Service Absorption: ASTM D1056; 1.0 percent (pipe) by volume, 1.0 percent (sheet) by volume.
5. Maximum Vapor Transmission: ASTM E96; 0.20 perm inches.
6. Maximum Flame Spread: ASTM E84; 25.
7. Maximum Smoke Developed: ASTM E84; 50.
8. Connection: Waterproof vapor barrier adhesive.

C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

2.05 JACKETS

A. PVC Plastic.

1. Manufacturers:

a. Johns Manville Corporation: www.jm.com.
b. Knauf.
c. Ceel-Co.

d. Certain Teed.

2. Jacket: One piece molded type fitting covers and sheet material, off-white color.

a. Minimum Service Temperature: 0 degrees F.

b. Maximum Service Temperature: 150 degrees F.

c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E 96/E 96M.

d. Maximum Flame Spread: ASTM E84; 25.

e. Maximum Smoke Developed: ASTM E84; 50.

f. Thickness: 15 mil.

g. Connections: Pressure sensitive color matching vinyl tape.

h. Jacket shall be ultraviolet-resistant.

i. Jackets shall meet USDA and FDA requirements where applicable.

3. Covering Adhesive Mastic:

a. Compatible with insulation.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

C. Equipment nameplates, identification tags, etc. shall not be covered by insulation.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Exposed Piping: Locate insulation and cover seams in least visible locations. Install PVC jackets and fitting covers. Paint to match finishes. Refer to specification section 09900 - Coordinate color with Architect.

C. Glass fiber insulated pipes conveying fluids below ambient temperature:

1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic. Vapor barrier shall be continuous.

2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

3. Insulate entire system including fittings, valves, unions, flanges, etc.. Bevel and seal ends of insulation. Provide removable insulation access sections to permit access and removal of unions, flanges, and strainer baskets. Access sections shall be capable of removal and replacement with no damage to adjacent insulation.

D. Glass fiber insulated pipes conveying fluids above ambient temperature:

1. Provide standard jackets, with vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.

2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

3. Finish with tape and white paintable vapor barrier jacket.
4. Insulate entire system including fittings, valves, unions, flanges, etc.. Bevel and seal ends of insulation.

E. Provide removable insulation covers for providing access/removal of unions, and flanges. Access sections shall be capable of removal and replacement with no damage to adjacent insulation.

F. Continue insulation through walls, sleeves, pipe hangers/rollers, and other pipe penetrations. Install steel sleeves at all wall and floor penetrations. Finish at supports, protrusions, and interruptions. At fire separations, fire caulk per building code requirements.

G. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with PVC jacket and fitting covers.

H. Buried Piping: Provide factory fabricated assembly with inner all-purpose service jacket with self-sealing lap, and asphalt impregnated open mesh glass fabric, with one mil thick aluminum foil sandwiched between three layers of bituminous compound; outer surface faced with a polyester film.

I. Ends of insulation shall be sealed off. Spray paint is not acceptable. There shall be no exposed ends.

J. Insulation not properly installed shall be removed and replaced or repaired as necessary.

K. Insulation on hot surfaces shall be applied while the surfaces are hot to avoid breaking of insulation during expansion of piping.

3.03 SCHEDULES

A. Plumbing Systems:

1. Domestic Hot Water Supply:
   a. Glass Fiber Insulation:
      1) Pipe Size Range: 2 inch and smaller.
         a) Thickness: 1.0 inch.
      2) Pipe Size Range: 2-1/2 inch and larger.
         a) Thickness: 1.5 inch.
2. Domestic Hot Water Recirculation:
   a. Glass Fiber Insulation:
      1) Pipe Size Range: 2 inch and smaller.
         a) Thickness: 1 inch.
      2) Pipe Size Range: 2-1/2 inch and larger.
         a) Thickness: 1.5 inch.
3. Domestic Cold Water:
   a. Glass Fiber Insulation:
      1) Pipe Size Range: All sizes.
         a) Thickness: 1.0 inch.

END OF SECTION

SECTION 22 0721

PIPING SAFETY COVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping Safety Covers.

B. Lavatory Piping Enclosure.

1.02 REFERENCES

A. ANSI/ICC A117.1 - American National Standard for Accessible and Usable Buildings and Facilities; International Code Council.

B. ASTM C 177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.

C. ASTM D 635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position.

D. ASTM D 2240 - Standard Test Method for Rubber Property--Durometer Hardness.

1.03 SUBMITTALS

A. Product Data: Manufacturer's descriptive literature for products specified in this section.

B. Shop Drawings: Indicate locations and configurations of piping insulation for indicated plumbing configurations.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Store products of this section in manufacturer's unopened packaging until installation; maintain storage conditions for products in accordance with manufacturer's recommendations.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer: Truebro, Inc.; www.truebro.com.

B. McGuire Manufacturing.

2.02 PIPING INSULATION ACCESSORIES

A. Provide products that comply with the following:

1. Americans With Disabilities Act (ADA), Article 4.19.4.
2. ANSI/ICC A117.1, American National Standard for Accessible Buildings and Facilities.
3. BOCA Basic Building Code.
4. Requirements of applicable building code.

B. Piping Safety Covers: Truebro Lav-Guard.

1. Characteristics: Three-piece molded assembly, minimum 1/8 inch wall thickness, with internal ribs to provide air space between piping and piping insulation jacket, molded to receive manufacturer's snap-clip fasteners.
2. Vinyl Material: Impact-resistant and stain-resistant molded closed-cell anti-microbial vinyl compound, UV-stable, non-fading, non-yellowing; having the following performance characteristics:

a. Burning Characteristics: 0 seconds Average Time of Burning (ATB), 0 mm Area of Burning (AEB), when tested in accordance with ASTM D 635.

b. Thermal Conductivity: K-value 1.17, when tested in accordance with ASTM C 177.

c. Indentation Hardness: 60, minimum, when tested in accordance with ASTM D 2240, using Type A durometer.

3. Trap Assembly Cover: Three-piece assembly, with removable clean-out nut enclosure.

4. Angle Stop Covers: Formed with hinged cap for access to valve without requiring cover removal.

5. Configurations: In accordance with manufacturer's product data for project piping configurations indicated on drawings.

6. Color: China White, gloss finish; paintable.

7. Fasteners: Manufacturer's standard re-usable snap-clip fasteners; wire-tie fasteners not permitted.

C. Lavatory Piping Enclosure: Truebro Lav-Shield.

1. Characteristics: One-piece rigid molded vinyl enclosure, minimum 1/8 inch wall thickness, factory-punched for manufacturer's wall fasteners.

2. Vinyl Material: Impact-resistant and stain-resistant molded closed-cell vinyl, having the following performance characteristics:

a. Burning Characteristics: 0 seconds Average Time of Burning (ATB), 0 mm Area of Burning (AEB), when tested in accordance with ASTM D 635.

b. Indentation Hardness: 69, minimum, when tested in accordance with ASTM D 2240, using Type A durometer.

3. Vinyl Color: China White, fine-textured finish; paintable.

4. Fasteners: Manufacturer's standard stainless steel wall fasteners with tamper-resistant heads.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that piping configurations are correct type for piping cover component configurations specified.

3.02 INSTALLATION

A. Install products of this section in accordance with manufacturer's printed installation instructions.

B. Install "Lav-Shields" below wall mounted lavatories/sinks to completely conceal exposed piping/traps/mixing valves/etc.

C. Install "Lav-Guards" below counter mounted lavatories/sinks to cover exposed piping/traps.

3.03 PROTECTION OF INSTALLED PRODUCTS

A. Do not allow damage to installed products by subsequent construction activities; protect products until Substantial Completion.

END OF SECTION

SECTION 22 1005

PLUMBING PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe, pipe fittings, valves, and connections for piping systems.

1. Sanitary sewer.
2. Domestic water.
3. Gas.

1.02 REFERENCE STANDARDS

A. ANSI Z21.22 - American National Standard for Relief Valves and Automatic Gas Shutoff Devices for Hot Water Supply Systems.

B. ASME B16.3 - Malleable Iron Threaded Fittings; The American Society of Mechanical Engineers.

C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers (ANSI B16.18).

D. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers.

E. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes; The American Society of Mechanical Engineers.

F. ASME B31.1 - Power Piping; The American Society of Mechanical Engineers (ANSI/ASME B31.1).

G. ASME B31.9 - Building Services Piping; The American Society of Mechanical Engineers (ANSI/ASME B31.9).

H. ASME (BPV IV) - Boiler and Pressure Vessel Code, Section IV - Rules for Construction of Heating Boilers; The American Society of Mechanical Engineers.

I. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

J. ASTM A 74 - Standard Specification for Cast Iron Soil Pipe and Fittings.

K. ASTM A 234/A 234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.

L. ASTM B 32 - Standard Specification for Solder Metal.

M. ASTM B 88 - Standard Specification for Seamless Copper Water Tube.

N. ASTM B 88M - Standard Specification for Seamless Copper Water Tube (Metric).

O. ASTM C 564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.

P. ASTM D 2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.

Q. ASTM D 2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.

R. ASTM D 2855 - Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride)

(PVC) Pipe and Fittings.

S. ASTM D 3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

T. ASTM F 477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

U. ASTM F 679 - Standard Specification for Poly(Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.

V. AWS D10.9 - Specifications for Qualification of Welding Procedures and Welders for Piping and Tubing.

W. AWWA C105/A21.5 - Polyethylene Encasement for Ductile-Iron Pipe Systems; American Water Works Association (ANSI/AWWA C105/A21.5).

X. AWWA C111/A21.11 - Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings; American Water Works Association (ANSI/AWWA C111/A21.11).

Y. AWWA C151/A21.51 - Ductile-Iron Pipe, Centrifugally Cast, for Water; American Water Works Association (ANSI/AWWA C151/A21.51).

Z. AWWA C651 - Disinfecting Water Mains; American Water Works Association (ANSI/AWWA C651).

AA. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications; Cast Iron Soil Pipe Institute.

BB. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications; Cast Iron Soil Pipe Institute.

CC. ICC-ES AC01 - Acceptance Criteria for Expansion Anchors in Masonry Elements.

DD. ICC-ES AC106 - Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry Elements.

EE. ICC-ES AC193 - Acceptance Criteria for Mechanical Anchors in Concrete Elements.

FF. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements.

GG. MSS SP-58 - Pipe Hangers and Supports - Materials, Design and Manufacture; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc..

HH. MSS SP-67 - Butterfly Valves; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc..

II. MSS SP-70 - Cast Iron Gate Valves, Flanged and Threaded Ends; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc..

JJ. MSS SP-71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc..

KK. MSS SP-78 - Cast Iron Plug Valves, Flanged and Threaded Ends; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc..

LL. MSS SP-80 - Bronze Gate, Globe, Angle and Check Valves; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc..

MM. MSS SP-85 - Cast Iron Globe & Angle Valves, Flanged and Threaded Ends; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc..

NN. MSS SP-89 - Pipe Hangers and Supports - Fabrication and Installation Practices; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc..

OO. MSS SP-110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends; Manufacturers Standardization Society of the Valve and Fittings Industry, Inc..

PP. NFPA 54 - National Fuel Gas Code; National Fire Protection Association.

QQ. NFPA 58 - Liquefied Petroleum Gas Code; National Fire Protection Association.

RR. ASTM A 536 - Standard Specification for Ductile Iron Castings.

SS. ASTM F 1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for use in Piping Applications.

TT. AWWA C606 - Grooved and Shouldered Joints.

1.03 SUBMITTALS

A. Project Record Documents: Record actual locations of valves.

B. Grooved joint couplings and fittings shall be shown on drawings and product submittals, and shall be specifically identified with the applicable style or series designation.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with State of Michigan, standards.

B. Valves: Bear UL and FMRC label or marking. Manufacturer's name and pressure rating marked on valve body.

C. Solder containing lead may not be used for any systems.

D. All castings used for coupling housings, fittings, valve bodies, etc., shall be date stamped for quality assurance and traceability.

E. Test drainage piping systems in accordance with their respective and applicable governing codes. Test drainage and waste piping hydraulically by filling the system to its highest point or at a static head of 10 feet, whichever is higher.

F. Pressure test plumbing piping (domestic cold water, domestic hot water, hot water recirculation, etc.) in accordance with governing and applicable codes. At minimum, test with water at 225 PSIG - permissible pressure drop shall be 0 PSIG over 2 hour period.

G. Pressure test natural gas and propane gas piping in accordance with governing and applicable codes. At minimum, test with air at 100 PSIG - permissible pressure drop shall be 0 PSIG over 2 hour period.

1.05 REGULATORY REQUIREMENTS

A. Perform Work in accordance with State and local plumbing and mechanical codes.

B. Conform to applicable code for installation of backflow prevention devices.

C. Provide certificate of compliance from authority having jurisdiction indicating approval of installation of backflow prevention devices.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.07 FIELD CONDITIONS

A. Do not install underground piping when bedding is wet or frozen.

PART 2 PRODUCTS

2.01 SANITARY SEWER WASTE AND VENT PIPING (SAN, V), BURIED WITHIN 5 FEET OF BUILDING

A. Cast Iron Pipe: ASTM A 74 extra heavy weight.

1. Fittings: Cast iron.
2. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C 564 neoprene gaskets or lead and oakum.

B. Cast Iron Pipe: CISPI 301, hubless.

1. Fittings: Cast iron.
2. Joints: CISPI 310, neoprene gasket and stainless steel clamp and shield assemblies.

C. PVC Pipe: ASTM D 2665 or ASTM D 3034.

1. Fittings: PVC.
2. Joints: Solvent welded, with ASTM D 2564 solvent cement.
3. Note: All pipes passing under footings, or through foundation walls, shall be cast iron (hubless, service weight piping) or sleeved through a steel pipe sleeve.

2.02 SANITARY WASTE AND VENT PIPING (SAN, V), ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.

1. Fittings: Cast iron.
2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

B. PVC Pipe: ASTM D 2665.

1. Fittings: PVC.
2. Joints: Solvent welded, with ASTM D 2564 solvent cement.
3. Note: Only use PVC piping where allowed by Building Codes - do not use PVC piping in return air plenums.
4. Note: PVC piping is not approved for use where exposed to damage (i.e. surface mounted in a storage room, mechanical room, gymnasium, etc.).

2.03 DOMESTIC HOT WATER (HW), DOMESTIC COLD WATER (CW), AND DOMESTIC HOT WATER RETURN (HWR) PIPING, ABOVE GRADE

A. Copper Tube: ASTM B 88 (ASTM B 88M), Type L (B), Drawn (H).

1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
2. Joints: ASTM B 32, solder, Grade 95TA. Solder containing lead will not be permitted.

B. Minimum System Pressure Rating: 125 psig.

C. Isolation Valves: Gate or ball valves for sizes 2 inch and smaller, gate or butterfly valves for sizes 2-1/2 inch and larger.

D. Exposed piping for sinks, toilets, urinals, etc. shall be chrome plated. Refer to fixture specifications for details.

2.04 NATURAL GAS PIPING (G), BURIED WITHIN 5 FEET OF BUILDING

A. Steel Pipe: ASTM A 53/A 53M Schedule 40 black.

1. Fittings: ASTM A 234/A 234M, wrought steel welding type.
2. Joints: ASME B31.1, welded.
3. Jacket: AWWA C105/A21.5 polyethylene jacket or double layer, half-lapped 10 mil polyethylene tape.

B. Soft Copper Tubing: ASTM B88, seamless and jointless soft copper tubing may be used for sizes 2 inch and smaller. No solder joints shall be permitted on below grade copper tubing.

C. For sizes 2" and less: Pre-sleeved stainless steel flexible gas pipe with fully ventable polyethylene sleeve. Manufacturer: OmegaFlex "TracPipe PS-2".

2.05 NATURAL GAS PIPING (G), ABOVE GRADE

A. Steel Pipe: ASTM A 53/A 53M Schedule 40 black.

1. Fittings: ASME B16.3, malleable iron, or ASTM A 234/A 234M, wrought steel welding type.
2. Joints: NFPA 54, threaded or welded to ASME B31.1.

B. Interior ONLY - Corrugated Stainless Steel Tubing (CSST): ASTM A240, type 304 stainless steel with a minimum nominal wall thickness of 0.010 inches. System shall comply with ANSI LC-1 "Standard for Fuel Gas Piping Using Corrugated Stainless Steel Tubing (CSST), and carrying listings by CSA International (Certification Number 1009875), ICC Evaluation Services (Report Number ESR-1031) and IAPMO Research & Testing (Certificate of Listing Number 3250).

1. Fittings: Corrugated stainless steel tube fittings: Mechanical tube fittings manufactured from ASTM B16 type 360 brass whose design incorporates a double wall flare for gas-tight seal with mechanical capture of the jacket for enhanced tubing protection. Include ends with threads according to ASME B1.20.1 for connection to threaded pipe or fittings.
2. Protective Coating: Furnish corrugated stainless steel tubing with factory-applied corrosion -resistant polyethylene jacket for use in corrosive atmosphere. Coating properties include the following:
   a. Corrugated stainless steel tube jacket shall be UV-Resistant polyethylene meeting the requirements of ASTM E84 for flame spread and smoke density.
3. Low pressure, 0.5 psig (14 inch Water Column) or less, Natural Gas Systems: Use the following :
   a. 1/2 to 2-inch NPS: Corrugated stainless steel tube and brass fittings.
4. Medium pressure, over 0.5 psig (14 inch Water Column) up to 5 psig, Natural Gas Systems: Use the following :
   a. 1/2 to 2-inch NPS: Corrugated stainless steel tube and brass fittings.

C. Isolation Valves: AGA approved and UL listed ball valves for sizes 3 inch and smaller and UL listed lubricated plug valves for sizes 4 inches and larger.

2.06 FLANGES, UNIONS, AND COUPLINGS

A. Unions for Pipe Sizes 2-1/2 inches and Under:

1. Ferrous pipe: Class 150 malleable iron threaded unions.
2. Copper tube and pipe: Class 150 bronze unions with soldered joints.

B. Flanges for Pipe Size Over 2-1/2 inches:

1. Ferrous pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.

   a. Flange Adapter: Flat face, ductile iron housings with elastomer pressure responsive gasket, for direct connection to ANSI Class 125 or 150 flanged components. Victaulic Style 741 (or approved equal).

2. Copper tube and pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.

C. Dielectric Connections: Union or waterway fitting with galvanized or plated steel threaded end, grooved end, copper solder end, water impervious isolation barrier. Victaulic Style 47 (or approved equal).

2.07 PIPE HANGERS AND SUPPORTS

A. Plumbing Piping - Drain, Waste, and Vent:

1. Conform to MSS SP-58.
2. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Carbon steel, adjustable swivel, split ring.
3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
5. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
6. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
7. Vertical Support: Steel riser clamp.
8. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
9. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

B. Plumbing Piping - Water:

1. Conform to MSS SP-58.
2. Hangers for Pipe Sizes 1/2 Inch to 1-1/2 Inches: Carbon steel, adjustable swivel, split ring.
3. Multiple or Trapeze Hangers: Steel channels with welded supports or spacers and hanger rods.
4. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
5. Vertical Support: Steel riser clamp.
6. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
7. Floor Support for Hot Pipe Sizes to 4 Inches: Cast iron adjustable pipe saddle, locknut, nipple, floor flange, and concrete pier or steel support.
8. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

C. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:

1. Concrete Wedge Expansion Anchors: Complying with ICC-ES AC193.
2. Masonry Wedge Expansion Anchors: Complying with ICC-ES AC01.
3. Concrete Screw Type Anchors: Complying with ICC-ES AC193.

4. Masonry Screw Type Anchors: Complying with ICC-ES AC106.
5. Concrete Adhesive Type Anchors: Complying with ICC-ES AC308.
6. Other Types: As required.

208 BALL VALVES

A. Manufacturers:
1. Conbraco Industries: www.conbraco.com.
2. Nibco, Inc.: www.nibco.com.
3. Milwaukee Valve Company: www.milwaukeevalve.com.
4. Victaulic Company: www.victaulic.com

B. Construction, 2 Inches and Smaller: 300 psi CWP, forged brass two piece body, chrome plated brass ball and stem, regular port, TFE seats and seals, blow-out proof stem, lever handle, with Vic-Press 304™ ends. Victaulic Series 589 (or approved equal).

C. Ball valves for natural gas service shall be UL labeled for such service.

2.09 PIPING TRANSITIONS

A. Manufacturers:
1. Can-Tex Industries Div. of Harsco Corp.; Model CT-Adapters:
2. Fernco Joint Sealer Co.; Model PVC Donut
3. Joint, Inc.; Model Caulder.

B. Provide transitions for jointing two different types of pipe materials such as cast iron, clay, steel, plastic, or copper. Fabricate transitions with bushings capable of resisting normal moisture corrosion.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that excavations are to required grade, dry, and not over-excavated.

3.02 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Prepare piping connections to equipment with grooved couplings, flanges or unions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

C. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

D. Install piping to maintain headroom, conserve space, and not interfere with use of space.

E. Group piping whenever practical at common elevations.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

H. Provide access where valves and fittings are not exposed.

I. Provide support for utility meters in accordance with requirements of utility companies.

J. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Section 09 9000.

K. Install bell and spigot pipe with bell end upstream.

L. Install valves with stems upright or horizontal, not inverted.

M. Install water piping to ASME B31.9.

N. Gas piping shall be painted per specification section 09900 and mechanical and building code requirements.

O. Vent sleeved gas piping that is buried below building slab per fuel gas code requirements.

P. PVC Pipe: Make solvent-welded joints in accordance with ASTM D 2855.

Q. Sleeve pipes passing through partitions, walls and floors.

R. Each fixture shall have isolation valves provided. All run-outs from piping mains to fixtures shall have isolation valves installed near the main take-off, whether shown on the plans or not. All isolation valves shall be located in accessible locations.

S. Minimum underground sanitary pipe size shall be 3".

T. All fixtures shall be vented in accordance with a venting method approved by the ruling Plumbing Code.

U. All plumbing vents through the roof shall be located a minimum of 24" from the edge of the parapet or edge of roof.

V. All plumbing vents through the roof shall be located a minimum of 10 feet from any building outdoor air intake (i.e. louvers, windows, etc.).

W. Do not route/locate below grade piping below, or with 45 degrees of the bottom corner of, foundation walls/footings. Coordinate with structural trades prior to installing piping.

X. Pipe Hangers and Supports:

1. Install in accordance with MSS SP-89.
2. Support horizontal piping as scheduled.
3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
4. Place hangers within 12 inches of each horizontal elbow.
5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
6. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
7. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
8. Provide copper plated hangers and supports for copper piping.
9. Prime coat exposed steel hangers and supports. Refer to Section 09 9000. Hangers and

supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

10. Support cast iron drainage piping at every joint.
11. Roof mounted gas piping shall be supported by Polycarbonate pipe supports.
    a. Miro Industries, Inc. Model 1.5, 3-R-2, 3-R-4, 4-R, 5-R, or as required for sizes 6" and up.
    b. Pipe supports shall be placed on top of polycarbonate support pads or additional pad of roof material.

3.04 APPLICATION

A. Install unions downstream of valves and at equipment or apparatus connections.
   1. Unions are not required in installations using grooved mechanical joint couplings. (The couplings shall serve as unions and disconnect points.)

B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

C. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

3.05 TOLERANCES

A. Drainage Piping: Establish invert elevations within 1/2 inch vertically of location indicated and slope to drain at minimum of 1/8 inch per foot slope, for pipes 3 inches - 6 inches in diameter. Pipes smaller than 3 inches in diameter shall drain at minimum 1/4 inch per foot slope.

B. Water Piping: Slope at minimum of 1/32 inch per foot and arrange to drain at low points.

3.06 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

A. Prior to starting work, verify system is complete, flushed and clean.

B. Ensure Ph of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).

C. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.

D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.

E. Maintain disinfectant in system for 24 hours.

F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.

G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.

H. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

3.07 SERVICE CONNECTIONS

A. Modify existing gas service as required to accommodate renovations. Coordinate any modifications with the utility company (i.e. regulator, meter, etc.). Coordinate flow and pressure requirements with gas utility.

3.08 SCHEDULES

A. Pipe Hanger Spacing:
   1. Metal Piping:
      a. Pipe size: 1/2 inches to 1-1/4 inches:

1) Maximum hanger spacing: 6.5 ft.
2) Hanger rod diameter: 3/8 inches.

b. Pipe size: 1-1/2 inches to 2 inches:
1) Maximum hanger spacing: 10 ft.
2) Hanger rod diameter: 3/8 inch.

c. Pipe size: 2-1/2 inches to 3 inches:
1) Maximum hanger spacing: 10 ft.
2) Hanger rod diameter: 1/2 inch.

d. Pipe size: 4 inches to 6 inches:
1) Maximum hanger spacing: 10 ft.
2) Hanger rod diameter: 5/8 inch.

2. Plastic Piping:

a. All Sizes:
1) Maximum hanger spacing: 6 ft.
2) Hanger rod diameter: 3/8 inch.

END OF SECTION

SECTION 22 1006

PLUMBING PIPING SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Trap Primers.

B. Cleanouts.

C. Water hammer arrestors.

D. Thermostatic mixing valves.

1.02 REFERENCE STANDARDS

A. ASME A112.6.3 - Floor and Trench Drains; The American Society of Mechanical Engineers.

B. ASME A112.6.4 - Roof, Deck, and Balcony Drains; The American Society of Mechanical Engineers.

C. ASME A112.21.2M - Roof Drains; The American Society of Mechanical Engineers.

D. ASSE 1011 - Hose Connection Vacuum Breakers; American Society of Sanitary Engineering (ANSI/ASSE 1011).

E. ASSE 1012 - Backflow Preventer with Intermediate Atmospheric Vent; American Society of Sanitary Engineering (ANSI/ASSE 1012).

F. ASSE 1019 - Vacuum Breaker Wall Hydrants, Freeze Resistant Automatic Draining Type; American Society of Sanitary Engineering (ANSI/ASSE 1019).

G. PDI-WH 201 - Water Hammer Arresters; Plumbing and Drainage Institute.

1.03 SUBMITTALS

A. Product Data: Provide component sizes, rough-in requirements, service sizes, and finishes.

B. Shop Drawings: Indicate dimensions, weights, and placement of openings and holes.

1. Provide pressure loss figures for backflow preventers and double check valves.

C. Manufacturer's Instructions: Indicate Manufacturer's Installation Instructions: Indicate assembly and support requirements.

D. Project Record Documents: Record actual locations of equipment, cleanouts, backflow preventers, water hammer arrestors.

E. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than 10 years documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Accept specialties on site in original factory packaging. Inspect for damage.

1.06 EXTRA MATERIALS

A. Supply for OWNER's use in maintenance of project:

1. Two service kits for thermostatic mixing valves.

2. Two spare trap seal primers.

PART 2 PRODUCTS

2.01 DRAINS

A. Manufacturers:

1. Josam Company: www.josam.com.
2. Jay R. Smith Manufacturing Company: www.jayrsmith.com.
3. Zurn Industries, Inc.: www.zurn.com.
4. Wade.

B. Floor Drain (FD-1):

1. ASME A112.21.1M; lacquered cast iron two piece body with double drainage flange, weep holes, reversible clamping collar, trap primer connection, and adjustable round nickel-bronze strainer.
2. Lacquered finish is standard. Use clamping collar on floors above grade. This is a standard floor drain used in toilet rooms, janitor's closets, showers, etc.
3. Zurn model # Z-415 (with type B-strainer), JR Smith model # 2005, or equal.

C. Wood Deck Floor Drains:

1. PVC or cast iron body with a steel anchor flange.
2. Product: Zurn light commercial FD-2240 series, or equal.

2.02 TRAP PRIMERS

A. Manufacturers:

1. Jay R. Smith Manufacturing Company: www.jayrsmith.com.
2. Zurn Industries, Inc.: www.zurn.com.
3. Precision Plumbing Products, Inc. (PPP Inc.).

B. For single trap primer installations:

1. Install JR smith "PRIME-ESE" P-trap trap primer on the sanitary outlet of lavatories or drinking fountains.
2. Install PPP Inc. model P1 or P2 trap primer valve on domestic cold water supply pipe (maximum 1-1/2") feeding nearby sink, lavatory, water cooler, etc.

C. For multiple trap primer installations:

1. Install PPP Inc. model P1 or P2 trap primer valve and PPP Inc. trap primer distribution unit with up to 4 outlets to up to 8 floor drains.

2.03 CLEANOUTS

A. Manufacturers:

1. Jay R. Smith Manufacturing Company: www.jayrsmith.com.
2. Josam Company: www.josam.com.
3. Zurn Industries, Inc.: www.zurn.com.
4. Wade.

B. Cleanouts at Exterior Surfaced Areas (CO-1):

1. Round cast nickel bronze access frame and non-skid cover.

C. Cleanouts at Exterior Unsurfaced Areas (CO-2):

1. Line type with lacquered cast iron body and round epoxy coated gasketed cover.

D. Cleanouts at Interior Finished Floor Areas (CO-3):

1. Lacquered cast iron body with anchor flange, reversible clamping collar, threaded top assembly, and round gasketed scored cover in service areas and round gasketed depressed cover to accept floor finish in finished floor areas.

E. Cleanouts at Interior Finished Wall Areas (CO-4):

1. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.

F. Cleanouts at Interior Unfinished Accessible Areas (CO-5): Calked or threaded type. Provide bolted stack cleanouts on vertical rainwater leaders.

2.04 WATER HAMMER ARRESTORS

A. Manufacturers:

1. Jay R. Smith Manufacturing Company: www.jayrsmith.com.
2. Watts Regulator Company: www.wattsregulator.com.
3. Zurn Industries, Inc.: www.zurn.com.

B. Water Hammer Arrestors:

1. Stainless steel construction, bellows type sized in accordance with PDI-WH 201, precharged suitable for operation in temperature range -100 to 300 degrees F and maximum 150 psi working pressure.

2.05 MIXING VALVES

A. Thermostatic Mixing Valves; Point of Use:

1. Manufacturers:
   a. ESBE: www.esbe.se.
   b. Leonard Valve Company: www.leonardvalve.com
   c. Lawler.
   d. Watts: Model MMV-M1.
2. Valve: Bronze body, stainless steel disc and spring, integral temperature adjustment cap with locking feature. Copper thermostat assembly. Buna-N; EPDM O'rings. Integral filter washers and check valves on hot and cold water inlets. ASSE 1070 listed.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Cleanouts:

1. Cleanouts shall be installed in accessible locations and provided in any horizontal drainage line which changes direction more than 45 degrees, at the ends of main and branch runs, base of stacks, and at all traps
2. Cleanouts in horizontal drainage lines located inside the building shall be provided at maximum spacing of 50 feet for drains 4 inches and smaller. All horizontal drainage lines

inside the building larger than 4 inches shall have cleanouts spaced at a maximum of 100 feet.

3. Provide cleanouts in any drainage line that penetrates building exterior walls. Cleanouts shall be either inside or outside of the building.
4. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Ensure clearance at cleanout for rodding of drainage system.
5. Encase exterior cleanouts in concrete flush with grade.
6. Install floor cleanouts at elevation to accommodate finished floor.
7. Provide code required clearances for all cleanouts.

C. Floor drains:

1. Coordinate installation of floor drains with the work of placing concrete to assure proper drain elevation and floor slope.
2. Cast floor drains into the concrete at the time the floors are placed and make watertight.
3. Floor drains in above ground slabs shall be flashed with separate finish with square lead sheet pans. Floor drains in slabs on grade provided with membrane or metal pan waterproofing do not require lead flashing, but shall have two additional layers of the waterproofing at the floor drains. Flashing shall not obstruct the weepholes.
4. Floor drain trap size shall match the outlet size of the drain and the size shown on the plans. Minimum floor drain outlet/piping size shall be 3".
5. Floor drain traps subject to loss by evaporation (i.e. storage rooms, mechanical rooms, bathrooms, etc.) shall have a deep seal trap consisting of at least a 4 inch seal, a trap primer connection, and be protected by a trap primer valve.
   a. Trap Primers:
      1) Trap primer shall be provided for all floor drains subject to loss of seal by evaporation (i.e. storage rooms, bathrooms, mechanical rooms, etc.).
      2) Tap off top of domestic cold water main pipe feeding nearby plumbing fixture.
      3) Trap primer valves shall be installed in concealed but accessible locations for maintenance.

D. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to lavatories, sinks, washing machine outlets, water closets, urinals, dishwashers, bathtubs/showers, and other applicable fixture locations with quick closing valves.

E. Install ASSE 1070 listed "point of use" thermostatic mixing valves at all accessible fixtures (lavatories, sinks, etc.). Provide Lav-Shields under lavatories to conceal mixing valves.

END OF SECTION

SECTION 22 4000

PLUMBING FIXTURES

PART 1 GENERAL

1.01 SECTION INCLUDES

Water closets.

Lavatories.

Sinks.

Electric water coolers.

Showers.

1.02 REFERENCE STANDARDS

A. ANSI Z358.1 - American National Standard for Emergency Eyewash and Shower Equipment.

B. ASME A112.6.1M - Supports for Off-the-Floor Plumbing Fixtures for Public Use; The American Society of Mechanical Engineers.

C. ASME A112.18.1 - Plumbing Supply Fittings; The American Society of Mechanical Engineers.

D. ASME A112.19.2 - Vitreous China Plumbing Fixtures and Hydraulic Requirements for Water Closets and Urinals; The American Society of Mechanical Engineers.

1.03 SUBMITTALS

A. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.

B. Maintenance Data: Include installation instructions, operation, maintenance data, spare and replacement parts lists, exploded assembly views, and fixture trim exploded view.

C. Warranty: Submit manufacturer warranty and ensure forms have been completed in OWNER's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum 10 years of documented experience.

1.05 REGULATORY REQUIREMENTS

A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept fixtures on site in factory packaging. Inspect for damage.

B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

1.07 FIELD MEASUREMENTS

A. Confirm that millwork/casework is constructed with adequate provision for the installation of countertop lavatories and sinks.

PART 2 PRODUCTS

2.01 TANK TYPE WATER CLOSETS

A. Tank Type Water Closet Manufacturers:

1. American Standard Inc.: www.americanstandard.com.
2. Eljer.
3. Kohler Company: www.kohler.com.

B. Refer to plumbing fixture schedule.

C. Seat Manufacturers:

1. Bemis Manufacturing Company: www.bemismfg.com.
2. Church Seat Company: www.churchseats.com.
3. Olsonite: www.olsonite.com.
4. Centoco.

D. Seat:

1. Solid white plastic, open front, extended back, less cover, complete with self-sustaining hinge.

2.02 LAVATORIES

A. Lavatory Manufacturers:

1. American Standard Inc.: www.americanstandard.com.
2. Eljer.
3. Kohler Company: www.kohler.com.
4. Zurn.

B. Refer to plumbing fixture schedule.

C. Supply Faucet Manufacturers:

1. American Standard Inc.: www.americanstandard.com.
2. Kohler Company: www.kohler.com.
3. Chicago Faucet.
4. Delta.
5. Zurn.
6. Sloan.

D. Accessories:

1. Chrome plated 17 gage brass P-trap with clean-out plug and arm with escutcheon.
2. Offset waste with perforated open strainer.
3. Screwdriver stops.
4. Rigid supplies.
5. Wall Mounted Lavatory Carrier:
   a. Manufacturers:
      1) JOSAM Company: www.josam.com.
      2) Sloan Valve Company.
      3) Zurn Industries, Inc.: www.zurn.com.

4) JR Smith.

b. ASME A112.6.1M; cast iron and steel frame with tubular legs, lugs for floor and wall attachment, concealed arm supports, bearing plate and studs.

2.03 SINKS

A. Sink Manufacturers:

1. American Standard Inc.: www.americanstandard.com.
2. Eljer.
3. Kohler Company: www.kohler.com.
4. Just.
5. Elkay.

B. Refer to plumbing fixture schedule.

C. Supply Faucet Manufacturers:

1. American Standard Inc.: www.americanstandard.com.
2. Eljer: www.eljer.com.
3. Kohler Company: www.kohlerco.com.
4. Elkay.
5. Chicago Faucet.
6. Delta.
7. Zurn.

D. Accessories: Chrome plated 17 gage brass P-trap with clean-out plug and arm with escutcheon, screwdriver stop, rigid supplies.

2.04 PANEL SHOWERS

A. Manufacturers:

1. Bradley.
2. Leonard.
3. Acorn.

B. Refer to plumbing fixture schedule.

2.05 ELECTRIC WATER COOLERS

A. Electric Water Cooler Manufacturers:

1. Tri Palm International/Oasis: www.tripalmint.com.
2. Elkay Manufacturing Company: www.elkay.com.
3. Haws Corporation: www.hawsco.com.
4. Halsey Taylor.

B. Refer to plumbing fixture schedule.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that walls and floor finishes are prepared and ready for installation of fixtures.

B. Verify that electric power is available and of the correct characteristics.

C. Confirm that millwork is constructed with adequate provision for the installation of counter top lavatories and sinks.

3.02 PREPARATION

A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install each fixture with trap, easily removable for servicing and cleaning.

C. Provide chrome plated rigid supplies to fixtures with screwdriver stops, reducers, and escutcheons.

D. Install components level and plumb.

E. Install and secure fixtures in place with wall carriers and bolts.

F. Seal fixtures to wall and floor surfaces with sealant, color to match fixture.

G. Furnish and install all plumbing fixtures complete with all supply, soil, waste and vent piping connections; together with all fittings, supports, fastening devices, cocks, valves and appurtenances required to complete installations.

H. All faucets and exposed traps, fittings, trim, connections, etc. shall be of polished chromium plated brass unless otherwise specified.

I. Chrome plated pipe, valves and fittings shall be installed with strap wrenches and padded tools to avoid damage to chrome plated surfaces.

J. Solidly attach water closets to floor with lag screws. Lead flashing is not intended hold fixture in place.

K. Install "Lav-Shields" below wall mounted lavatories/sinks to completely conceal exposed piping/traps/mixing valves/etc.

L. Install "Lav-Guards" below counter mounted lavatories/sinks to cover exposed piping/traps.

3.04 INTERFACE WITH WORK OF OTHER SECTIONS

A. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough-in and installation.

B. Coordinate fixture heights and installation with architectural plans, details, sections, and elevations.

3.05 ADJUSTING

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.06 CLEANING

A. Clean plumbing fixtures and equipment.

3.07 SCHEDULES

A. Fixture Heights: Install fixtures to heights above finished floor as indicated.

1. Water Closet:

a. Standard: 15 inches to top of bowl rim.

b. Accessible: 18 inches to top of seat.

2. Lavatory:

a. Standard: 31 inches to top of basin rim.

b. Accessible: 34 inches to top of basin rim.

3. Drinking Fountain:

a. Standard Adult: 40 inches to top of basin rim.

b. Accessible: 36 inches to top of spout.

4. Shower Heads:

a. Adult Male: 69.5 inches to bottom of head.

B. Coordinate fixture heights and installation with architectural plans, details, sections, and elevations.

C. Fixture Rough-In

1. Water Closet (Tank Type):

a. Cold Water: 1/2 Inch.

b. Waste: 4 Inch.

c. Vent: 2 Inch.

2. Lavatory:

a. Hot Water: 1/2 Inch.

b. Cold Water: 1/2 Inch.

c. Waste: 1-1/2 Inch.

d. Vent: 1-1/4 Inch.

3. Sink:

a. Hot Water: 1/2 Inch.

b. Cold Water: 1/2 Inch.

c. Waste: 1-1/2 Inch.

d. Vent: 1-1/4 Inch.

4. Electric Water Cooler:

a. Cold Water: 1/2 Inch.

b. Waste: 1-1/4 Inch.

c. Vent: 1-1/4 Inch.

5. Shower:

a. Hot Water: 1/2 Inch.

b. Cold Water: 1/2 Inch.

c. Waste: 1-1/2 Inch.

d. Vent: 1-1/4 Inch.

END OF SECTION

SECTION 23 0001

GENERAL MECHANICAL REQUIREMENTS

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. This Division includes all labor, materials, equipment, tools, supervision, start-up services, Owner training, etc., including all incidental and related items, necessary to complete installation and successfully test and start up and operate the mechanical systems indicated on the drawings, AND as described in each Section of Division 230000 Specifications.

B. All drawings and General Provisions of the Contract, including the General Conditions, Supplementary General Conditions, and Division 1 specification sections, apply to work of all Division 230000 sections. The items in this section are not intended to supersede, but are supplementary to, the requirements set forth in other Divisions of the specifications.

C. The Contractor, and his Subcontractors and Suppliers, shall include in his bid all materials, labor, and equipment involved, in accordance with all local customs, codes, rules, regulations; and secure compliance of all parts of the Specifications and Drawings regardless of Sectional inclusion in these Specifications.

D. The Contractor shall be held responsible for the complete and satisfactory accomplishment of all Work inclusive of whatever miscellaneous material and/or appurtenances are required to perfect the installation, and demonstrate that all electrical systems will operate satisfactorily under normal operating conditions.

1.02 DRAWINGS

A. The drawings are diagrammatic and show the general location and arrangement of equipment, piping, ductwork and related items. They shall be followed as closely as elements of the construction will permit. The Contractor shall provide/install all mechanical systems, and associated equipment, complete and include all necessary offsets, fittings, and other components required due to interferences, space constraints, code requirements, etc. as required to provide a complete/functional system.

B. The general mechanical requirements are intended to augment the drawings and specifications. Should conflicts occur between the drawings and the specifications, the strictest provision shall govern. Where there are conflicts or differences between the drawings for the various trades, report such conflicts or differences to the Architect and/or Engineer for resolution.

C. The Contractor shall examine the drawings of all other trades in order to verify the conditions governing the work on the job site. Arrange work accordingly, providing all ductwork, piping, fittings, traps, valves and accessories as may be required to meet such conditions.

D. Deviations from the drawings, with the exception of minor changes in routing and other such incidental changes that do not affect the functioning or serviceability of the systems, shall not be made without the written approval of the Architect and/or Engineer.

E. The architectural and structural drawings take precedence in all matters pertaining to the building structure, mechanical drawings in all matters pertaining to mechanical trades and electrical drawings in all matters pertaining to electrical trades. Where there are conflicts or differences between the drawings for the various trades, report such conflicts or differences to the Architect and/or Engineer for resolution.

1.03 COORDINATION OF WORK

A. The Contractor shall verify clearance requirements of all electrical and mechanical equipment/systems prior to the installation of any new work. Mechanical equipment, piping,

ductwork, systems, etc. shall not interfere with mechanical equipment spaces or electrical clearances. The Contractor shall coordinate his work to obtain symmetry in ceiling layouts, so that sprinkler heads, lights, diffusers, etc. are coordinated and are installed per the Architectural reflected ceiling plan.

B. The Contractor and his Subcontractors shall be responsible for all tasks applicable to their work in accordance with the Specifications, Drawings, and code requirements, and shall be responsible for coordinating locations and arrangements of their work to give best results with all other relevant trades.

1. Coordinate his work to obtain symmetry in ceiling layouts, so that lights, diffusers, etc. are coordinated and are installed per the Architectural reflected ceiling plan.
2. Coordinate all wall, roof, floor penetrations, equipment pads, equipment locations, system routings, etc. with architectural and structural trades.
3. Verify requirements of all equipment with shop drawing submittals prior to installation - notify Architect and/or Engineer of any conflicts between shop drawings and plans.
4. Coordinate rough-in locations of mechanical control devices (i.e. thermostats, sensors, etc.) with electrical trades. T-stats shall be located @ 48" AFF unless noted otherwise.
5. Coordinate locations of mechanical items that require access (i.e. isolation valves, balance valves, balance dampers, fire dampers, damper actuators, valve actuators, exhaust fans, filters, etc.) with reflected ceiling plan. Items located above hard non-accessible ceilings shall be provided with access doors as required.
6. Do not route/locate below grade piping below, or with 45 degrees of the bottom corner of, foundation walls/footings. Coordinate with structural trades prior to installing piping.
7. Verify clearance requirements of all electrical and mechanical equipment/systems prior to the installation of any new work. Mechanical equipment, piping, ductwork, systems, etc. shall not interfere with electrical equipment spaces. Electrical conduit and equipment clearances shall not interfere with mechanical equipment spaces.

1.04 INSPECTION OF SITE AND PROJECT DOCUMENTATION

A. The Contractor shall visit the site and examine/verify the conditions under which the work must be conducted before submitting proposal. The Contractor shall examine the drawings and specifications of all other trades including Mechanical, Architectural, Structural and Electrical.

B. The submitting of a proposal implies that the Contractor has visited the site, examined all contract documents, and understands the conditions under which the work must be conducted.

C. The Contractor shall notify the Architect and/or Engineer, prior to submitting his bid via Request For Information (RFI), of any potential problems that he has identified during his inspection of the site or from the review of plans/specifications. RFIs must be submitted at least 5 working days prior to bid opening.

1.05 GENERAL SUPPORT REQUIREMENTS

A. Provide all necessary angle/brackets, hangers, or supplementary supporting steel as required for adequate support for all piping, ductwork, and equipment. Secure approval form Architect and/or Structural Engineer, in writing, before welding or bolting to steel framing or anchoring to concrete structure, or cutting/coring thru structural systems.

B. Where piping, ductwork, or equipment is supported or suspended from concrete construction, provide approved concrete inserts in formwork to receive hanger rods, such as Unistrut or Powerstrut, and where installed in metal deck, use Ramset or Welds as required.

1.06 GUARANTEE

A. Contractor shall guarantee that all labor, materials, and equipment are free from defects and

agrees to replace or repair any part of this installation which becomes defective within a period of one year from the date of substantial completion following final acceptance. Acceptance date of substantial completion shall be as determined by the Architect and/or Engineer.

B. The Contractor shall file with the Owner any and all guarantees from the equipment manufacturers including the operating conditions and performance capacities they are based on.

1.07 CODES, PERMITS AND FEES

A. Refer to Division 1, General Conditions and Supplementary Conditions.

B. Unless otherwise indicated, all required permits, plan reviews, licenses, inspections, approvals and fees for mechanical work shall be secured and paid for by the Contractor.

C. All work shall be executed in accordance with the most current rules and regulations set forth in local and state codes.

1. Mechanical and Plumbing systems shall be installed per the Owner's current jurisdictional codes (Michigan Mechanical Code, Michigan Plumbing Code, International Fuel Gas Code, etc.), current NFPA codes (NFPA 101, NPFA 90, etc.), and applicable sections of the Michigan Building Code. Coordinate Owner's current codes with Owner's representative prior to work.

D. Where the drawings and/or specifications indicate materials or construction in excess of code requirements, the drawings and/or specifications shall govern. In the event that the plans and specifications conflict with any rules, regulations, or codes applying, said rules, regulations and codes shall govern.

1.08 SUBSTITUTION ITEMS REQUIRING PRIOR APPROVAL

A. All items that the Contractor proposed to use in the work that are not specifically named in the contract documents must be submitted for review. Such items must be submitted in duplicate to the Architect and/or Engineer for approval a minimum of ten (10) days prior to bid opening. Requests for prior approval must be accompanied by complete catalog information, including but not limited to, model, size, accessories, complete electrical information and performance data in the form given in the equipment schedule on the drawings at stated design conditions. Where items are referred to by symbolic designations on the drawings, all requests for prior approval shall bear the same designations.

1.09 MATERIAL AND EQUIPMENT MANUFACTURERS

A. All items of equipment shall be furnished complete with all accessories normally supplied with the catalog items listed and all other accessories necessary for a complete and satisfactory operating system. All equipment and materials shall be new and shall be standard products of manufacturers regularly engaged in the production of plumbing, heating, ventilating and air conditioning equipment and shall be the manufacturer's latest design.

B. If an approved manufacturer is other than the manufacturer used as the basis for design, the equipment of product provided shall be equal in quality, durability, appearance, capacity and efficiency through all ranges of operation, shall conform with arrangements and space limitations of the equipment shown on the plans and/or specified, shall be compatible with the other components of the system and shall comply with the requirements for Substitution Items Requiring Prior Approval specified in this Section of the Specifications. All costs to make these items of equipment comply with these requirements including, but not limited to, piping, sheet metal, electrical work, and building alterations shall be included in the original bid.

C. All package unit skid mounted equipment that are factory assembled shall meet, in detail, the products named and specified within each section of the detailed mechanical and electrical Specifications.

1.10 OPERATION AND MAINTENANCE INSTRUCTIONAL MANUALS

A. Provide compete maintenance and operating instructional manuals covering all mechanical equipment as specified herein, Division 1 requirements, and individual equipment specification sections.

B. The O&M data shall be bound in a suitable number of 3" or 4", 3-ring, hard cover binders. Permanently imprinted on the cover shall be the words, "Manufacturer's Operation and Maintenance Data", project title, location of project, and the date. A table of contents shall be provided in the front of each binder.

C. Maintenance and operating instructional manuals shall be job specific to this project. Generic manuals are not acceptable. Each piece of equipment in the O&M manual shall be identified as identified on the project drawings (i.e. Fan Coil FC-A1, Condensing Unit CU-A, Exhaust Fan EF-1, etc.).

D. Internally subdivide the binder contents with permanent page dividers, organized by major equipment/systems (i.e. Ductless Split Heat Pump, Exhaust Fans, etc.)

E. Contents: Each volume of O&M manual shall have three parts:

1. Part 1: A directory listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: O&M data, arranged and subdivided by major equipment/systems. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers:

   a. List of equipment.

   b. Copies of Shop drawings and product data, approved by Architect/Engineer.

   c. Installation and operational procedures.

   d. Routine maintenance procedures.

   e. Trouble shooting procedures.

   f. Complete parts lists by nomenclature, manufacturer's part number and use.

   g. Recommended spare parts lists.

   h. Lubrication chart listing all types of lubricants to be used for each piece of equipment and the recommended frequency of lubrication.

   i. Complete wiring and schematic diagrams.

   j. Elevations and/or sections cut through all of the major equipment and sub-assemblies.

3. Part 3: Project documents and certificates, including the following:

   a. Testing, Adjusting, and Balance Reports (approved by Engineer).

   b. Warranty Certificates.

   c. Copies of approved construction permits.

F. Maintenance and Operating manuals shall be provided to the Architect and/or Engineer for review when construction is 75% complete.

G. A minimum of two (2) copies of all approved Operation and Maintenance literature shall be furnished to the Owner within 10 days after final inspection. O&M manuals must be completed prior to start of Owner training as the manuals shall be used as the basis of the training.

1.11 SHOP DRAWINGS/SUBMITTALS

A. Refer to General Conditions and Supplementary General Conditions.

B. All shop drawings shall be submitted in groupings of similar and/or related items. Incomplete

submittal groupings will be returned unchecked.

C. Unless noted otherwise, submit digital (.pdf format) copies of complete manufacturer's shop drawings for all equipment, valves, plumbing and heating specialties, refrigeration specialties, pipe hangers, wiring diagrams and control diagrams including, but not limited to the items listed below. Where items are referred to by symbolic designation on the drawings and specifications, all submittals shall bear the same designation. Refer to other Sections of the mechanical specifications for additional requirements.

1. Ductless Split Heat Pump System
2. Fans
3. Grilles, Registers and Diffusers

1.12 INSTRUCTION OF OWNER PERSONNEL

A. Before final inspection the Contractor shall instruct Owner's designated personnel in operation, adjustment and maintenance of mechanical equipment and systems at agreed upon times.

B. For equipment requiring seasonal operation, perform instructions for other seasons within six months.

C. Use Operation and Maintenance Manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

D. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

1.13 RECORD DRAWINGS

A. Contractor shall submit to the Architect and/or Engineer, record drawings which have been neatly marked to represent as-built conditions for all new mechanical work.

B. The Contractor shall keep accurate note of all deviations from the construction documents and discrepancies in the concealed conditions and other items of construction on field drawings as they occur. The marked up field documents shall be available for review by the Architect and/or Engineer, and Owner at their request.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 INSTALLATION OF EQUIPMENT

A. Install equipment in strict accordance with all directions and recommendations furnished by the manufacturer. Where such directions are in conflict with the drawings and specifications, report such conflicts to the Architect and/or Engineer for resolution.

3.02 DEMOLITION WORK

A. All demolition of existing mechanical equipment and materials shall be done by the Contractor unless otherwise indicated. Included are all items such as, but not limited to, existing piping, pumps, ductwork, supports and equipment where such items are not required for the proper operation of the modified system.

B. In general, demolition work is indicated on the drawings. However, the Contractor shall visit the job to determine the full extent and character of this work.

C. The Contractor shall review all other contract documents (i.e. architectural plans, electrical plans, etc.) to review the extent of demolition and remodeling work.

D. Unless specifically noted to the contrary, removed materials shall not be reused in the work. Salvaged materials that are to be reused shall be stored safe against damage and turned over to

the appropriate trade for reuse. Salvaged materials of value that are not to be reused shall remain the property of the Owner unless such ownership is waived. Remove items from the systems and turn over to the Owner in their condition prior to removal. The Owner shall move and store these materials. Items on which the Owner waives ownership shall become the property of the Contractor, who shall remove and legally dispose of, away from the premises.

E. Work that has been cut or partially removed shall be protected against damage until covered by permanent construction.

F. Clean and flush the interior and exterior of all existing relocated equipment and its related piping, valves, and accessories that are to be reused of all mud, debris, pipe dope, oils, welding slag, loose mill scale, rust and other extraneous material so that the existing equipment and all accessories can be repainted and repaired as required to place in first-class working condition.

G. Where existing equipment is to be removed, cap piping under floor, behind face of wall, above ceiling or at mains.

H. Provide sheet metal caps on ductwork and cap piping immediately adjacent to demolition as soon as demolition commences in order to allow existing systems to remain in operation. Caps shall be of same material as service requiring such.

3.03 WORK IN EXISTING BUILDINGS

A. The Owner will provide access to existing buildings as required. Access requirements to occupied buildings shall be identified on the project schedule. The Contractor, once work is started in the existing building, shall complete same without interruption so as to return work areas as soon as possible to Owner.

B. Adequately protect and preserve all existing and newly installed work. Promptly repair any damage to same at Contractor's expense.

C. Consult with the Architect and/or Engineer as to the methods of carrying on the work so as not to interfere with the Owner’s operation any more than absolutely necessary. Accordingly, all service lines shall be kept in operation as long as possible and the services shall only be interrupted at such time as will be designated by the Architect and/or Owner's Representative.

3.04 WORK INVOLVING OTHER TRADES

A. Certain items of equipment or materials specified in the Mechanical Division may have to be installed by other trades due to code requirements or union jurisdictional requirements. In such instances, the Contractor shall complete the work through an approved, qualified subcontractor and shall include the full cost for same in his bid.

3.05 LUBRICATION

A. Provide all lubrication for the operation of the mechanical equipment until acceptance by the Owner. Contractor shall be responsible for all damage to bearings up to the date of acceptance of the equipment. Protect all bearings and shafts during installation. Thoroughly grease steel shafts to prevent corrosion. Provide covers as required for proper protection of all motors and other equipment during construction.

3.06 COORDINATION

A. Install work to avoid interference with work of other trades including, but not limited to, architectural and electrical trades. Remove and relocate any work that causes an interference at Contractor's expense. Disputes regarding the cause of an interference shall be resolved by the Architect and/or Engineer.

3.07 CHASE, SHAFTS AND RECESSES

A. Coordinate with structural, architectural and other trades to ensure accurate location and size of chases, shafts and recesses required for mechanical systems.

3.08 SLEEVES

A. Provide and install Schedule 40 black steel pipe sleeves, cut to length, wherever pipes pass through above grade walls and floors. Provide and install galvanized steel pipe sleeves, cut to length, wherever pipes pass through below grade foundation walls and slab on grade floors. Sleeves shall terminate flush with walls in finished areas. All sleeves through the floor are to extend two (2) inches above finish floor.

B. Provide escutcheons at each penetration through walls, floors, and ceilings in exposed areas.

C. Patch sleeves to match building material.

3.09 SEALING OF MECHANICAL OPENINGS

A. Seal the space around pipes in sleeves and around duct openings through walls, floors and ceilings.

B. Provide adequate clearance to allow for proper duct/pipe movement and sealing.

C. Provide/install fireproof wall and floor sleeves as required by applicable building codes at all applicable wall, ceiling, and floor penetrations. Refer to Architectural plans for wall assembly ratings.

D. Sleeves placed in floors shall be flush with the underside of the floor construction and shall have planed, square ends, extending 2 inches above the finished floor, unless otherwise noted or detailed.

E. Where sleeves pass through reinforced concrete floors, they shall be properly set in position prior to concrete pouring in such a way that they will be maintained in position until the concrete is set.

F. Ducts and pipes passing through below grade perimeter walls or slabs on grade shall have the space between the duct/pipe and sleeve sealed watertight with a mechanically expandable elastomer seal device.

G. Penetrations through fire rated floors and walls shall be firestopped in accordance with applicable building code requirements with UL and FMRC approved materials and shall have a fire rating equal to or greater than the fire partition rating. Refer to architectural plans for locations and assembly ratings.

1. Packing: Refractory fiber or ceramic fiber.
   a. Manufacturers:
      1) Carborundum Fiberfrax.
      2) Johns-Manville - Cerafelt.
      3) Eagle Picher Epitherm 1200.
      4) Babcock and Wilcox Kaowool.
2. Fire stop sealant.
   a. Manufacturers:
      1) Hilti
      2) Tremco
      3) Mameco
      4) Pecora
3. For polypropylene (Acid Waste/Acid Vent piping) penetrations through fire rated assemblies, provide an intumescent firestop.

a. Hilti CP 642 Firestop Collar.

b. Hilti FS-ONE High Performance Intumescent Firestop Sealant.

c. 3M Fire Barrier PPD Plastic Pipe Device.

d. 3M Fire Barrier Intumescent Firestop Sealant.

4. Where combustible pipes, tubes, vents, etc. penetrate a fire rated assembly, such penetrations shall be protected by an approved through-penetration fire stop collar/sealant system per the building code.

a. Through -penetration firestop systems shall be tested in accordance with ASTM E814 with a minimum positive pressure differential of 0.01 inch WG. Through penetration firestop systems shall have a "F" rating and a "T" rating of not less than 1 hour but not less than the required rating of the assembly penetrated.

b. Hilti CP 642 Firestop Collar.

c. Hilti FS-ONE High Performance Intumescent Firestop Sealant.

d. 3M Fire Barrier PPD Plastic Pipe Device.

e. 3M Fire Barrier Intumescent Firestop Sealant.

3.10 CUTTING, CORING AND PATCHING

A. Refer to General Conditions.

B. Unless specifically noted otherwise, the Contractor shall perform all cutting, coring, and patching that may be necessary for the installation of their Work. All cutting, coring, patching and repair work shall be performed by the Contractor through qualified Subcontractors. Contractor shall include full cost of same in his bid.

C. Secure approval form Architect and/or Structural Engineer, in writing, before cutting, welding/bolting to, or anchoring from any structural building components (i.e. structural steel, load bearing walls, footings/foundations, concrete floors/ceilings, etc.).

3.11 EXCAVATION AND BACKFILLING

A. Provide all excavation, trenching, tunneling and backfilling required for the mechanical work.

B. Provide foundations if required to support underground piping.

C. Refer to Architectural/Structural specification sections for excavation and backfilling details.

3.12 EQUIPMENT FOUNDATIONS AND SUPPORTS

A. Shall be as required or as shown on plans or specified.

B. For equipment suspended form ceiling or walls, furnish and install all inserts, rods, structural steel frames, brackets and platforms required. Obtain approval of Architect and/or Structural Engineer for same including loads, locations, and methods of attachment.

3.13 EQUIPMENT CONNECTIONS

A. Make connections to equipment, fixtures and other items included in the work in accordance with the approved shop drawings and rough-in measurements furnished by the manufactures of the particular equipment furnished.

B. All piping connections to equipment shall be flanged or shall be made with unions to facilitate equipment removal.

C. Brass unions for connections of 2 inch and less and flanged union with dielectric gasket and bolt sleeves for 2-1/2 inch and greater shall be used for equipment connections of dissimilar metals.

D. All ductwork connections to air handling equipment shall be made with flexible duct connectors.

3.14 ACCESSIBILITY

A. All equipment shall be installed so as to be readily accessible for operation, maintenance, and repair, as required by the equipment manufacturer and as subject to the approval of the Engineer.

3.15 ACCESS DOORS

A. The Contractor, and/or his Subcontractors, shall provide access doors for access to any of their respective mechanical equipment (i.e. valves, controls, coils, motors, air vents, filters, equipment, etc.) that is installed in inaccessible areas. Provide access doors in the walls, as required to make all electrical boxes, controls and other equipment installed by the Contractor accessible. In the walls, provide Milcor No. "DW" or "M" as required to make all equipment installed by the Contractor accessible. Minimum size 12 inches x 12 inches. In the ceiling, provide Milcor N. 3210, 3105 or 3206 for accessibility as mentioned above, 24 inches x 24 inches minimum size. The plaster or acoustical tile insert shall be by the architectural trades. Areas with accessible ceilings (ceilings where tiles are not fastened in place and can be individually removed without removal of adjacent tiles) will not require access doors.

B. Refer to Architectural specifications for manufacturer's and model numbers and additional information.

C. The Contractor, and/or his Subcontractors, shall be responsible for quantities of access doors and shall receive approval for locations from the Architect and/or Engineer prior to installation.

D. The Contractor, and/or his Subcontractors, shall purchase appropriate access doors, coordinate locations, and shall pay for installation by a qualified architectural subcontractor.

E. When access doors are in fire resistant walls or ceilings, they must bear the Underwriters' Laboratories, Inc., Label, with time design rating equal to or exceeding that of the wall or ceiling unless they were a part of the tested assembly.

3.16 CLEANING

A. Each trade shall be responsible for removing all debris daily as required to maintain the work area in a neat, orderly condition.

B. After equipment, ductwork, piping systems have been completed and tested, each entire system shall be cleaned and flushed.

C. Prior to connection of new piping to existing piping systems, all new piping shall be subject to initial flushing, cleaning and final flushing. Provide temporary bypass piping and fittings, temporary valves and strainers, temporary water make-up piping with approved means of backflow prevention, and temporary pumps as needed to perform specified flushing and cleaning requirements.

3.17 PAINTING

A. All mechanical systems, equipment, piping, ductwork, etc. exposed in finished areas shall be painted to match the surrounding finishes. Refer to specification section 09900 - Coordinate color with Architect.

3.18 PROTECTION AND HANDLING OF EQUIPMENT AND MATERIALS

A. Electrical equipment furnished by Mechanical Trades and installed by Electrical Trades shall be turned over to Electrical Trades in good condition.

B. Equipment and materials shall be protected from theft, injury or damage.

C. Materials with enamel or glaze surface, shall be protected from damage by covering and/or coating as recommended in bulletin, "Handling and Care of Enameled Cast Iron Plumbing Fixtures," issued by the Plumbing Fixtures Manufacturers Association, and as approved.

D. Coat polished or plated metal parts with white petroleum jelly immediately after installation.

E. Protect equipment outlets, pipe and duct openings with temporary plugs or caps.

F. Provide adequate storage for all equipment and materials delivered to the job site. Equipment set in place in unprotected areas must be provided with temporary protection.

3.19 FILTERS

A. Provide and maintain filters in air handling systems throughout the construction period and prior to final acceptance of the building. Do not run air handling equipment without all prefilters and final filters as specified.

B. Immediately prior to final building acceptance by the Owner, the Contractor shall:

1. Thoroughly wash, recharge and reinstall cleanable type air filters.

2. Replace all disposable type air filters, prefilters and final filters, with new units. In addition to replacing the filters with new ones, the contractor shall supply the Owner with an extra set of each filter for the Owner's use.

3.20 GENERAL SUPPORT REQUIREMENTS

A. Each mechanical trade shall provide all required supporting components to properly support their work. Supporting components/systems shall be in accordance with Code and as specified.

B. Provide all necessary angle/brackets or supplementary steel as required for adequate support for all piping, ductwork, specialties, and equipment. Secure approval form Architect and/or Engineer, in writing, before welding or bolting to steel framing or anchoring to concrete structure.

C. Where piping, ductwork, specialties, or equipment is supported or suspended from concrete construction, provide approved concrete inserts in formwork to receive hanger rods, such as Unistrut or Powerstrut, and where installed in metal deck, use Ramset or Welds as required.

D. Hangers for ductwork 48 inches and wider located in Mechanical Rooms shall be sized to also support fire protection system branch piping.

3.21 PIPING INSTALLATION IN PLENUM SPACES

A. Pipe and pipe fittings installed in mechanical air plenum spaces shall of non-combustible materials. If PVC piping is specified as an approved material, it shall be wrapped with at least 1.5 inches of non-combustible insulation plus continuous vapor barrier which meet building code required smoke and flame spread ratings.

B. Coordinate location of mechanical plenum spaces with electrical trades for plenum rated cable requirements.

3.22 DRAWINGS AND MEASUREMENTS

A. These specifications and accompanying drawings are intended to describe and provide for finished work. They are intended to be cooperative, and what is called for by either the drawings or specifications shall be as binding as if call for by both. The work herein described shall be complete in every detail.

B. The Drawings are not intended to be scaled for rough-in measurements, nor to serve as Shop Drawings. Field measurements necessary for ordering materials and fitting the installation to the building construction and arrangement shall be taken by the Contractor. The Contractor shall check latest architectural drawings to locate equipment/fixtures/etc., check latest structural drawings for interferences, etc..

3.23 EXTRA WORK

A. For any extra work which may be proposed, the Contractor shall furnish to the General Contractor/Construction Manager, an itemized breakdown of the estimated cost of all materials

and labor required to complete this work. The estimate cost breakdown shall include unit prices (same prices for increase/decrease of work) for all materials (i.e. duct, piping, valves, equipment, equipment rental, etc.) and all labor (i.e. manhours, overtime, etc.) which may be required for any proposed extra work. The Contractor shall not proceed until receiving a written order from the General Contractor establishing the agreed price and describing the work to be done.

END OF SECTION

SECTION 23 0713

DUCT INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Duct insulation.

1.02 REFERENCE STANDARDS

A. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

B. ASTM C 553 - Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.

C. ASTM C 612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.

D. ASTM C 1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material).

E. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

F. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials.

G. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association.

H. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association.

I. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc..

1.03 SUBMITTALS

A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

B. Manufacturer's Instructions: Indicate installation procedures necessary to ensure acceptable workmanship and that installation standards will be achieved.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than 10 years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum 10 years of experience and approved by manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.06 FIELD CONDITIONS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

B. Maintain temperature during and after installation for minimum period of 24 hours.

1.07 INSULATION OF EXISTING SYSTEMS

A. On renovation/addition projects where existing ductwork systems are being modified the existing ductwork systems shall be reinsulated as required to maintain sealed insulation/vapor barrier.

B. After completion of any required asbestos abatement, reinsulate all existing systems.

PART 2 PRODUCTS

2.01 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E 84, NFPA 255, or UL 723.

B. Where insulation and covering is specified or required to include a vapor barrier, it is critical that the integrity of the vapor barrier is continuously maintained. Fasteners or other securing devices that may unintentionally penetrate, or damage, the vapor barrier are prohibited. Where fasteners must penetrate the vapor barrier, the vapor barrier shall be repaired.

2.02 GLASS FIBER, FLEXIBLE (EXTERIOR DUCT WRAP)

A. Manufacturer:

1. Knauf Insulation: www.knaufusa.com.
2. Johns Manville Corporation: www.jm.com.
3. Owens Corning Corp: www.owenscorning.com.
4. CertainTeed Corporation: www.certainteed.com.

B. Insulation: ASTM C 553; flexible, noncombustible blanket.

1. 'K' value: 0.29 at 75 degrees F, when tested in accordance with ASTM C 518.
2. Maximum Service Temperature: 450 degrees F.
3. Maximum Water Vapor Sorption: 5.0 percent by weight.
4. Maximum Density: 1.5 lb./cu ft.

C. Vapor Barrier Jacket:

1. Kraft paper with glass fiber yarn and bonded to aluminized film.
2. Moisture Vapor Permeability: 0.058 ng/Pa s m (0.04 perm inch), when tested in accordance with ASTM E 96/E 96M.
3. Secure with pressure sensitive tape.

D. Vapor Barrier Tape:

1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive. The use of duct tape is prohibited.

E. Outdoor Vapor Barrier Mastic:

1. Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.

F. Tie Wire: Annealed steel, 16 gage.

2.03 GLASS FIBER, RIGID (EXTERIOR BOARD DUCT INSULATION)

A. Manufacturer:

1. Knauf Insulation: www.knaufusa.com.

2. Johns Manville Corporation: www.jm.com.
3. Owens Corning Corp: www.owenscorning.com.
4. CertainTeed Corporation: www.certainteed.com.

B. Insulation: ASTM C 612; rigid, noncombustible blanket.
1. 'K' value: 0.31 at 75 degrees F, when tested in accordance with ASTM C 518.
2. Maximum service temperature: 450 degrees F.
3. Maximum Water Vapor Sorption: 5.0 percent.
4. Maximum Density: 3.0 lb./cu ft.

C. Vapor Barrier Jacket:
1. Kraft paper with glass fiber yarn and bonded to aluminized film.
2. Moisture Vapor Permeability: 0.058 ng/Pa s m (0.04 perm inch), when tested in accordance with ASTM E 96/E 96M.
3. Secure with pressure sensitive tape.

D. Vapor Barrier Tape:
1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive. The use of duct tape is prohibited.

E. Indoor Vapor Barrier Finish:
1. Vinyl emulsion type acrylic, compatible with insulation, white color.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that ducts have been tested before applying insulation materials.

B. Verify that surfaces are clean, foreign material removed, and dry.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NAIMA National Insulation Standards.

C. Insulated ducts conveying air below ambient temperature:
1. Provide insulation with vapor barrier jackets.
2. Finish with tape and vapor barrier jacket.
3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

D. Insulated ducts conveying air above ambient temperature:
1. Provide with standard vapor barrier jacket.
2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.
3. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

E. External Duct Insulation Application:

1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
2. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.
3. 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.
5. Continue insulation through wall penetrations using rigid fiberglass insulation 6 inches on either side of wall.

3.03 SCHEDULES

A. Supply Air Ducts and Fresh Air:

1. Flexible Glass Fiber Duct Insulation: 1.5 inches thick.
2. Rigid Glass Fiber Duct Insulation: 1.5 inches thick.

B. Ductwork passing through walls (6 inches on either side of wall):

1. Rigid Glass Fiber Duct Insulation: 1.5 inches thick.

END OF SECTION

SECTION 23 0719

HVAC PIPING INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Piping insulation.

B. Insulation jackets.

1.02 REFERENCE STANDARDS

A. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

B. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate [Metric].

C. ASTM C 177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded Hot Plate Apparatus.

D. ASTM C 195 - Standard Specification for Mineral Fiber Thermal Insulating Cement.

E. ASTM C 449 - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement.

F. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

G. ASTM C 534/C 534M - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.

H. ASTM C 547 - Standard Specification for Mineral Fiber Pipe Insulation.

I. ASTM C 795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.

J. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

K. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials.

L. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association.

M. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc..

1.03 SUBMITTALS

A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

B. Manufacturer's Instructions: Indicate installation procedures that ensure acceptable workmanship and installation standards will be achieved.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with not less than 10 years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section with minimum 10 years of experience.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site, labeled with manufacturer's identification, product density, and thickness.

B. Store insulation in original wrapping and protect from weather, dirt, chemicals, and damage.

1.06 FIELD CONDITIONS

A. Maintain ambient conditions required by manufacturers of each product.

B. Maintain temperature before, during, and after installation for minimum of 24 hours.

1.07 INSULATION OF EXISTING SYSTEMS

A. On renovation/addition projects where existing piping systems are being modified the existing piping systems shall be reinsulated as required to maintain sealed insulation/vapor barrier.

B. After completion of any required asbestos abatement, reinsulate all existing systems.

PART 2 PRODUCTS

2.01 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E 84, NFPA 255, or UL 723.

2.04 FLEXIBLE ELASTOMERIC CELLULAR INSULATION (CELLULAR FOAM)

A. Manufacturer:

1. Armacell International: www.armacell.com.
2. Armstrong "AP Armaflex".
3. Rubatex Corp..

B. Insulation: Preformed flexible elastomeric cellular rubber insulation complying with ASTM C 534 Grade 3; use molded tubular material wherever possible.

1. Minimum Service Temperature: -40 degrees F.
2. Maximum Service Temperature: 220 degrees F.
3. Connection: Waterproof vapor barrier adhesive.
4. K Value: ASTM C177 or C518; 0.27 at 75 degrees F.
5. Maximum Service Absorption: ASTM D1056; 1.0 percent (pipe) by volume, 1.0 percent (sheet) by volume.
6. Maximum Vapor Transmission: ASTM E96; 0.20 perm inches.
7. Maximum Flame Spread: ASTM E84; 25.
8. Maximum Smoke Developed: ASTM E84; 50.

C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

2.05 JACKETS

A. PVC Plastic.

1. Manufacturers:

a. Johns Manville Corporation: www.jm.com.
b. Knauf.
c. Ceel-Co..
d. Certain Teed.

2. Jacket: One piece molded type fitting covers and sheet material, off-white color.
   a. Minimum Service Temperature: 0 degrees F.
   b. Maximum Service Temperature: 150 degrees F.
   c. Moisture Vapor Permeability: 0.002 perm inch, maximum, when tested in accordance with ASTM E 96/E 96M.
   d. Thickness: 10 mil.
   e. Connections: Brush on welding adhesive.
   f. Maximum Flame Spread: ASTM E84; 25.
   g. Maximum Smoke Developed: ASTM E84; 50.
   h. Jacket shall be ultraviolet-resistant.
   i. Jackets shall meet USDA and FDA requirements where applicable.
3. Covering Adhesive Mastic:
   a. Compatible with insulation.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that piping has been tested before applying insulation materials.

B. Verify that surfaces are clean and dry, with foreign material removed.

C. Equipment nameplates, identification tags, etc. shall not be covered by insulation.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Exposed Piping: Locate insulation and cover seams in least visible locations. Install PVC jackets and fitting covers. Paint to match finishes. Refer to specification section 09900 - Coordinate color with Architect.

C. Glass fiber insulated pipes conveying fluids below ambient temperature:
   1. Provide vapor barrier jackets, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples and vapor barrier mastic. Vapor barrier shall be continuous.
   2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.
   3. Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints. Bevel and seal ends of insulation. Provide removable insulation access sections to permit access and removal of unions, flanges, and strainer baskets. Access sections shall be capable of removal and replacement with no damage to adjacent insulation.

D. Glass fiber insulated pipes conveying fluids above ambient temperature:
   1. Provide standard jackets, with vapor barrier, factory-applied or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding staples.
   2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
   3. Finish with tape and white paintable vapor barrier jacket.

4. Provide calcium silicate inserts or other heavy density insulating material suitable as approved by the Engineer for the planned temperature range, where pipes pass through walls, sleeves, pipe hangers/rollers, and other pipe penetrations.

5. Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints. Bevel and seal ends of insulation.

E. Provide removable insulation covers for providing access/removal of unions, flanges, etc.. Access sections shall be capable of removal and replacement with no damage to adjacent insulation.

F. Continue insulation through walls, sleeves, pipe hangers/rollers, and other pipe penetrations. Install steel sleeves at all wall and floor penetrations. Finish at supports, protrusions, and interruptions. At fire separations, fire caulk per building code requirements.

G. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet above finished floor): Finish with PVC jacket and fitting covers.

H. Ends of insulation shall be sealed off. Spray paint is not acceptable. There shall be no exposed ends.

I. Insulation not properly installed shall be removed and replaced or repaired as necessary.

3.03 SCHEDULE

A. Cooling Systems:

1. Cold Condensate Drains:

a. Cellular Foam Insulation:

1) Pipe Size Range: All sizes.

a) Thickness: 1 inch.

2. Refrigerant Suction:

a. Cellular Foam Insulation:

1) Pipe Size Range: All sizes.

a) Thickness: 1 inch.

3. Refrigerant Hot Gas:

a. Cellular Foam Insulation:

1) Pipe Size Range: All sizes.

a) Thickness: 1 inch.

END OF SECTION

SECTION 23 3100

HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Metal ductwork.

1.02 REFERENCE STANDARDS

A. ASTM A 36/A 36M - Standard Specification for Carbon Structural Steel.

B. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

C. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association.

D. NFPA 90B - Standard for the Installation of Warm Air Heating and Air Conditioning Systems; National Fire Protection Association.

E. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; National Fire Protection Association.

F. SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual; Sheet Metal and Air Conditioning Contractors' National Association.

G. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association.

H. SMACNA (KVS) - Kitchen Ventilation Systems and Food Service Equipment Fabrication & Installation Guidelines.

1.03 SUBMITTALS

A. Product Data: Provide data for duct materials and duct connections.

B. Shop Drawings: Submit shop drawings, including detailed layout drawings, of all ductwork and plenums. Contractor shall perform all necessary coordination with other trades when preparing the detailed layout drawings. Show details of construction, supports, access doors, reinforcement, fitting configuration, and accessory installation. Shop drawings shall be reviewed and approved by the Architect/Engineer prior to fabrication.

C. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA (LEAK) - HVAC Air Duct Leakage Test Manual.

D. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum 10 years of documented experience.

B. Installer Qualifications: Company specializing in performing the type of work specified in this section, with minimum 10 years of documented experience.

1.05 REGULATORY REQUIREMENTS

A. Construct ductwork to NFPA 90A, NFPA 90B, and NFPA 96 standards.

1.06 FIELD CONDITIONS

A. Do not install duct sealants when temperatures are less than those recommended by sealant manufacturers.

B. Maintain temperatures within acceptable range during and after installation of duct sealants.

1.07 COORDINATION REQUIREMENTS

A. Sheet metal trades shall coordinate all design, construction, and installation with all other trades.

B. Sheet metal trades shall cooperate with the Test and Balance Contractor and provide all miscellaneous caps and any other materials required for structural integrity and leakage testing of the complete ductwork system. Refer to Test and Balance specification section.

C. Coordinate painting requirements of exposed ductwork in finished areas with specification section 09900 and color with Architect.

1.08 DESIGN REQUIREMENTS

A. Duct sizes shown on drawings are inside clear dimensions. For lined ducts, maintain sizes inside lining.

B. No variation of duct configuration or sizes permitted except by written permission. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts.

C. Use material, weight, thickness, gauge, construction and installation methods as outlined in the latest addition of the following SMACNA publications, unless noted otherwise:

1. HVAC Duct Construction Standards, Metal and Flexible
2. HVAC Air Duct Leakage Test Manual
3. HVAC Systems - Duct Design
4. Rectangular Industrial Duct Construction
5. Round Industrial Duct Construction

D. Use products which conform to NFPA 90A, possessing a flame spread rating of less than 25 and a smoke developed rating of less than 50.

1.09 PRESSURE DEFINITIONS

A. Low Pressure Ductwork: Up to 2 inches WG and velocities less than 1,500 fpm. Construct for 2 inch WG positive and negative or positive static pressures.

PART 2 PRODUCTS

2.01 DUCT ASSEMBLIES

A. All Ducts: Galvanized steel, unless otherwise indicated.

B. Low Pressure Supply (Heating Systems): 2 inch w.g. pressure class, galvanized steel.

C. Low Pressure Supply (System with Cooling Coils): 2 inch w.g. pressure class, galvanized steel.

D. Return and Relief: 2 inch w.g. pressure class, galvanized steel.

E. General Exhaust: 1 inch w.g. pressure class, galvanized steel.

F. Transfer Air and Sound Boots: 1/2 inch w.g. pressure class, galvanized steel with acoustical duct liner.

2.02 MATERIALS

A. General: Non-combustible ducts, conforming to Class 1 air duct materials, or UL 181.

B. Galvanized Steel Ducts: ASTM A 653/A 653M galvanized steel sheet, Forming Steel (FS) designation, with G90/Z275 zinc coating.

1. Gaskets: Chloroprene elastomer, 40 Durometer, 1/8 inch thick, full face, one piece vulcanized or dovetail at joints.

2. All reinforcement for ducts having a side dimension 48" or less shall be external. Internal reinforcement shall be acceptable only for ducts having a side dimension greater than 48 inches. Reinforcement shall be provided per SMACNA standards.

C. Steel Ducts - Galvanized Round and Flat Oval Spiral: Galvanized sheet steel duct and fittings, lock forming quality per ASTM A527, Coating Designation G-90, factory fabricated, lock seam or welded design in accordance with SMACNA HVAC Duct Construction Standards or SMACNA Industrial Duct Construction Standards as required based on pressure class. Flat oval and round fittings shall be factory fabricated welded design. Use of field fabricated fittings (welded design) shall only be permitted when factory fabricated fittings are unavailable.

1. Manufacturers:

a. Dixi-Bilt.

b. Semco.

c. LaPine Metal Products.

d. United-McGill.

e. Univarsal Spiral Air.

D. Insulated Flexible Ducts, Low and Medium Pressure:

1. Flexible Ducts: Interlocking spiral of galvanized steel or aluminum construction or fabric supported helically wound spring steel wire or flat steel bands; rated to 6 inches WG positive and 4 inches negative for low and medium pressure ducts.

2. Insulated Flexible Ducts: Flexible duct wrapped with flexible fiber glass insulation, enclosed in a fire retardant polyethylene vapor barrier jacket; maximum 0.23 K value at 75 deg F.

3. Acoustical performance tested in accordance with the Air Diffusion Council's "Flexible Air Duct Test Code FD 72-R1."

4. Flexible Duct Fittings: Galvanized steel, twist in design with damper.

5. Manufacturer's:

a. Flexmaster Type 8M, UL 181, Class 1.

b. Automation Industries Thermaflex.

c. Hart & Cooley.

E. Caulk: Elastomer caulk, UL listed and per NFPA 90A.

F. Zinc Paint:

1. Manufacturers:

a. Carboline "Galvanox No. 1."

b. Tnemec.

c. Welco "Cold Galv."

G. Sealant: Indoor/outdoor water based duct sealant. UL listed, non-toxic, water resistant, 0

smoke/flame spread, compatible with mating materials, for use on all SMACNA seal Class A, B, and C joints, for use on 1/2 - 10" wg SMACNA pressure classes. Use PCD duct sealer on PVC coated steel ductwork.

1. Manufacturers:
   a. Hardcast "Duct-Seal #321"
   b. Foremost "PCD Duct Sealer"

H. Hanger Rod: ASTM A 36/A 36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

2.03 DUCTWORK FABRICATION

A. Low Pressure Ductwork (+/- 2 " W.G. Static Pressure Class)
   1. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

B. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

C. 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 must be used, provide air foil turning vanes of perforated metal with glass fiber insulation.

D. Fabricate continuously welded round and oval duct fittings in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
   1. Use double nuts and lock washers on threaded rod supports.
   2. Where ducts are connected to exterior wall louvers and duct outlet is smaller than louver frame, provide blank-out panels sealing louver area around duct. Use same material as duct, painted black on exterior side; seal to louver frame and duct.

2.04 DUCT MANUFACTURERS

A. Metal-Fab, Inc.

B. Semco, Inc.

C. United McGill Corporation.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install, support, and seal ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.

B. Install in accordance with manufacturer's instructions.

C. Flexible Ducts: Connect to metal ducts with liquid adhesive plus tape.

D. Duct sizes indicated are inside clear dimensions. For lined ducts, maintain sizes inside lining.

E. Install and seal metal and flexible ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.

F. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.

G. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

H. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of air flow.

I. Use double nuts and lock washers on threaded rod supports.

J. Connect diffusers or light troffer boots to low pressure ducts directly or with 5 feet maximum length of flexible duct held in place with strap or clamp.

K. Provide flexible duct connections where ductwork connects to fans, air handling equipment, and other rotating equipment and/or where indicated on the drawings.

L. Provide straight runs of ductwork at fans, coils, air terminal units, and other equipment per manufacturer's recommendations.

M. Where ducts pass through fire rated walls or floor dividing conditioned spaces from unconditioned spaces, provide a flanged duct-segment for installation during the time of construction to provide a tight seal.

N. Where ducts pass through walls and floors, finish wall openings with metal trim strips and curb floor openings. Wood frames are not permitted.

O. Install airfoil turning vanes in all rectangular mitered elbows, whether indicated on drawings or not.

3.02 DUCTWORK FABRICATION

A. Verify dimensions at the site, making field measurements and drawings necessary for fabrication and erection. Check plans showing work of other trades and consult with Architect and/or Engineer in the event of any interferences.

B. Fabricate necessary offsets and transitions to avoid interference with building construction, piping, equipment, etc. Make changes, offsets, etc. for duct obstructions per SMACNA HVAC Duct Construction Standards or SMACNA Industrial Duct Construction Standards as required based upon pressure class. However, do not reduce duct to less than 6 inches in any dimension and do not exceed an 8:1 aspect ratio. Where it is necessary to take pipes, beams, or other similar obstructions through ducts, construct easement as indicated in SMACNA HVAC Duct Construction Standards or SMACNA Industrial Duct Construction Standards. In all cases, seal to prevent air leakage.

C. Fabricate ductwork to prevent failure under pressure or vacuum created by fast closure of ductwork devices. Provide leaktight automatic relief devices where required.

D. Ducts or plenums of masonry construction are not acceptable.

E. Repair galvanized surfaces damaged by the application of zinc rich paint per manufacturer's instructions.

3.03 DUCT LEAKAGE

A. The maximum allowable total leakage rate for duct systems shall be 5% of their associated fan and/or air handling unit CFM.

3.05 PAINTING

A. All ductwork exposed in finished areas (insulated and/or uninsulated) shall be painted to match the surrounding finishes. Refer to specification section 09900 - Coordinate color with Architect.

END OF SECTION

SECTION 23 3300

AIR DUCT ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Air turning devices/extractors.

B. Volume control dampers.

1.02 REFERENCE STANDARDS

A. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association.

B. NFPA 92A - Standard for Smoke-Control Systems Utilizing Barriers and Pressure Differences.

C. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association.

D. UL 33 - Heat Responsive Links for Fire-Protection Service; Underwriters Laboratories Inc..

E. UL 555 - Standard for Fire Dampers; Underwriters Laboratories Inc..

F. UL 555S - Standard for Leakage Rated Dampers for Use in Smoke Control Systems; Underwriters Laboratories Inc..

1.03 SUBMITTALS

A. Product Data: Provide for shop fabricated assemblies including volume control dampers. Include electrical characteristics and connection requirements.

B. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers, duct access doors, and duct test holes.

C. Manufacturer's Installation Instructions: Provide instructions for fire dampers and combination fire and smoke dampers.

1.04 PROJECT RECORD DOCUMENTS

A. Record actual locations of access doors and test holes.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum 10 years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Protect dampers from damage to operating linkages and blades.

B. Handling: Handle and lift dampers in accordance with manufacturer’s instructions. Protect materials and finishes during handling and installation to prevent damage.

PART 2 PRODUCTS

2.01 AIR TURNING DEVICES/EXTRACTORS

A. Manufacturers:

1. Krueger: www.krueger-hvac.com.
2. Ruskin Company: www.ruskin.com.
3. Titus: www.titus-hvac.com.

4. Nailor.

B. Multi-blade device with blades aligned in short dimension; steel or aluminum construction; with individually adjustable blades, mounting straps.

2.08 VOLUME CONTROL DAMPERS

A. Manufacturers:

1. Louvers & Dampers, Inc.: www.louvers-dampers.com.
2. Nailor Industries Inc.: www.nailor.com.
3. Ruskin Company: www.ruskin.com.
4. American Warming and Ventilating Inc.
5. Greenheck.
6. NCA Manufacturing.
7. Air Balance Inc.

B. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated.

C. Single Blade Dampers: Fabricate for duct sizes up to 6 x 30 inch.

D. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 x 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.

E. End Bearings: Except in round ducts 6 inches and smaller, provide end bearings. On multiple blade dampers, provide oil-impregnated nylon or sintered bronze bearing.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install accessories in accordance with manufacturer's instructions, NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 23 3100 for duct construction and pressure class.

B. Provide balancing dampers at points on supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Install minimum 2 duct widths from duct take-off.

END OF SECTION

SECTION 23 3700

AIR OUTLETS AND INLETS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Diffusers.

B. Registers/grilles.

1.02 REFERENCE STANDARDS

A. ADC 1062: GRD - Test Code for Grilles, Registers & Diffusers; Air Diffusion Council.

B. AMCA 500-L - Laboratory Methods of Testing Louvers for Rating; Air Movement and Control Association International, Inc..

C. ASHRAE Std 70 - Method of Testing for Rating the Performance of Air Outlets and Inlets; American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc..

D. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association.

1.03 SUBMITTALS

A. Product Data: Provide data for equipment required for this project. Review outlets and inlets as to size, finish, and type of mounting prior to submission. Submit schedule of outlets and inlets showing type, size, make, model, finish, location, air quantity, pressure drop, neck or jet velocity, throw, diffusion range, and noise level.

1. Throw shall be the horizontal distance from the diffuser to the point where the theoretical centerline velocity is 50 feet per minute. The throw scheduled shall not exceed the horizontal distance between the diffuser and the nearest wall, or half the distance between ceiling diffusers.

2. Identify diffusers using the designations used in the drawings and specifications.

3. Sound data shall be given in terms of sound power level in octave bands 2 through 8, and NC index for the capacity range of the diffuser.

B. Project Record Documents: Record actual locations of air outlets and inlets.

1.04 QUALITY ASSURANCE

A. Test and rate air outlet and inlet performance in accordance with ASHRAE Std 70.

B. Test and rate louver performance in accordance with AMCA 500-L.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum 10 years of documented experience.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Carnes Company HVAC: www.carnes.com.

B. Krueger: www.krueger-hvac.com.

C. Price Industries: www.price-hvac.com.

D. Titus: www.titus-hvac.com.

E. Nailor.

F. Tuttle & Bailey.

2.02 DIFFUSERS, REGISTERS, AND GRILLS - GENERAL

A. Refer to schedules on drawings for quantities, types, finishes, and manufacturer's model numbers of diffusion devices.

B. Air diffusion devices have been chosen in terms of specific air distribution requirements, spacing, and sound characteristics. Provide ADC certified manufacturer's standard devices.

C. Provide plaster frames for diffusers installed in plaster ceilings.

D. Install wall mounted supply registers six (6) inches below ceiling, unless noted otherwise.

E. Diffusers shall be standard off-white baked enamel finish, unless noted otherwise. Contractors shall coordinate diffuser colors with architect prior to ordering. Provide air diffusion device interior surfaces, including blank-offs, with black matte finish.

F. Coordinate frame types with architectural reflected ceiling plan.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's 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.

D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, despite whether dampers are specified as part of the diffuser, or grille and register assembly.

E. Paint ductwork visible behind air outlets and inlets matte black. Refer to Section 09 9000.

END OF SECTION

SECTION 23 8128

SMALL DUCTLESS SPLIT SYSTEM HEATING AND COOLING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Air-source heat pumps.

B. Indoor ductless fan & coil units.

C. Controls.

1.02 REFERENCE STANDARDS

A. ARI 210/240 - Standard for Performance Rating of Unitary Air Conditioning and Air-Source Heat Pump Equipment; Air-Conditioning, Heating, and Refrigeration Institute.

B. ARI 520 - Positive Displacement Condensing Units; Air-Conditioning, Heating, and Refrigeration Institute.

C. ASHRAE Std 15 - Safety Standard for Refrigeration Systems; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc..

D. ASHRAE Std 23 - Methods of Testing for Rating Positive Displacement Refrigerant Compressors and Condensing Units; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc..

E. ASHRAE Std 90.1 - Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc..

F. ASHRAE Std 103 - Methods of Testing for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers; American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc..

G. NFPA 90A - Standard for the Installation of Air-Conditioning and Ventilating Systems; National Fire Protection Association.

H. NFPA 90B - Standard for the Installation of Warm Air Heating and Air Conditioning Systems; National Fire Protection Association.

1.03 SUBMITTALS

A. Product Data: Provide rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.

B. Shop Drawings: Indicate assembly, required clearances, and location and size of field connections.

C. Manufacturer's Instructions: Indicate rigging, assembly, and installation instructions.

D. Project Record Documents: Record actual locations of components and connections.

E. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.

F. Warranty: Submit manufacturer’s warranty and ensure forms have been filled out in OWNER s name and registered with manufacturer.

G. Maintenance Materials: Furnish the following for OWNER's use in maintenance of project.

1. Extra Filters: One for each unit.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum 10 years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum 10 years of experience and approved by manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Mitsubishi.

B. Fujitsu.

C. Daikin.

2.02 SYSTEM DESIGN

A. Split-System Heating and Cooling Units: Self-contained, packaged, matched factory-engineered and assembled, pre-wired indoor and outdoor units; UL listed.

1. Heating and Cooling: Air-source electric heat pump located in outdoor unit with evaporator coils in multiple ductless indoor units.

2. Provide refrigerant lines internal to units and between indoor and outdoor units, factory cleaned, dried, pressurized and sealed, with insulated suction line.

B. Performance Requirements: See Drawings for additional requirements.

1. Efficiency: Energy Efficiency Rating (EER)/Coefficient of Performance (COP) not less than requirements of ASHRAE Std 90.1; seasonal efficiency to ASHRAE Std 103.

C. Electrical Characteristics:

1. Power for the indoor unit(s) shall be supplied from the outdoor unit.

2. Disconnect Switch: Provide optional disconnect switch for mounting near each indoor unit (Mitsubishi #TAZ).

2.03 INDOOR UNITS FOR DUCTLESS SYSTEMS

A. Indoor Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, evaporator coil, and controls; wired for single power connection with control transformer.

B. Evaporator Coils: Copper tube aluminum fin assembly, galvanized or polymer drain pan sloped in all directions to drain, drain connection, refrigerant piping connections, restricted distributor or thermostatic expansion valve.

1. Construction and Ratings: In accordance with ARI 210/240 and UL listed.

2. Manufacturer: System manufacturer.

C. Filter:

1. Return air shall be filtered by means of a removable washable filter.

D. Controls:

1. Optional hard wired, wall mounted, controller.

2.04 OUTDOOR UNITS

A. Outdoor Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of

cabinet, with compressor and condenser.

1. Cabinet: Steel with baked enamel finish, easily removed and secured access doors with safety interlock switches, glass fiber insulation with reflective liner.
2. Construction and Ratings: In accordance with ARI 210/240 with testing in accordance with ASHRAE Std 23 and UL listed.

B. Compressor: ARI 520; hermetic, two speed 1800 and 3600 rpm, resiliently mounted integral with condenser, with positive lubrication, crankcase heater, high pressure control, motor overload protection, service valves and drier. Provide time delay control to prevent short cycling and rapid speed changes.

   a. Air Cooled Condenser: ARI 520; Aluminum fin and copper tube coil, with direct drive axial propeller fan resiliently mounted, galvanized fan guard.

C. Accessories: Filter drier, high pressure switch (manual reset), low pressure switch (automatic reset), service valves and gage ports, thermometer well (in liquid line).

   1. Provide thermostatic expansion valves.

D. Operating Controls:

   1. Control by room thermostat to maintain room temperature setting.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrates are ready for installation of units and openings are as indicated on shop drawings.

B. Verify that proper power supply is available and in correct location.

C. Verify that proper fuel supply is available for connection.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions and requirements of local authorities having jurisdiction.

B. Install in accordance with NFPA 90A and NFPA 90B.

C. Install refrigeration systems in accordance with ASHRAE Std 15.

D. Drain condensate from indoor fan coil units to nearest sanitary line.

END OF SECTION

SECTION 26 0001

GENERAL ELECTRICAL REQUIREMENTS

PART 1 GENERAL

1.01 DESCRIPTION OF WORK

A. This Division includes all labor, materials, equipment, tools, supervision, start-up services, Owner's Instructions, including all incidental and related items necessary to complete installation and successfully test and start up and operate the Electrical Systems indicated on Drawings and described in each Section of Division 26 Specifications, AND applicable Division 27 Specifications, AND applicable Division 28 Specifications, and conforming with ALL other Contract Documents.

B. The Drawings and General Provisions of the Contract, including the General Conditions, Supplementary General Conditions, and Division 1 specification sections, apply to work of Division 26 sections. The items in this section are not intended to supersede, but are supplementary to, the requirements set forth in other Divisions of the specifications.

C. The Contractor, and his Subcontractors and Suppliers, shall include in his bid all materials, labor, and equipment involved, in accordance with all local customs, codes, rules, regulations; and secure compliance of all parts of the Specifications and Drawings regardless of Sectional inclusion in these Specifications.

D. The Contractor shall be held responsible for the complete and satisfactory accomplishment of all Work inclusive of whatever miscellaneous material and/or appurtenances are required to perfect the installation, and demonstrate that all electrical systems will operate satisfactorily under normal operating conditions.

1.02 DRAWINGS & SPECIFICATIONS

A. The drawings are diagrammatic and show the general location and arrangement of equipment, outlets, lights and related electrical items. They shall be followed as closely as elements of the construction will permit. The Contractor shall provide/install all electrical systems, and associated equipment, complete and include all necessary wire/conduit, pull boxes, and other components required due to interferences, space constraints, code requirements, etc. as required to provide a complete/functional system.

B. These General Electrical Requirements are intended to augment the drawings and specifications. Should conflicts occur between the drawings and the specifications, the strictest provision shall govern. Where there are conflicts or differences between the drawings for the various trades, report such conflicts or differences to the Architect and/or Engineer for resolution.

C. The Contractor shall examine the drawings of all other trades in order to verify the conditions governing the work on the job site. Arrange work accordingly, providing all wiring, conduit, fittings, boxes, etc. as may be required to meet such conditions.

D. Deviations from the drawings, with the exception of minor changes in routing and other such incidental changes that do not affect the functioning or serviceability of the systems, shall not be made without the written approval of the Architect and/or Engineer.

E. The architectural and structural drawings take precedence in all matters pertaining to the building structure, mechanical drawings in all matters pertaining to mechanical trades and electrical drawings in all matters pertaining to electrical trades. Where there are conflicts or differences between the drawings for the various trades, report such conflicts or differences to the Architect and/or Engineer for resolution.

1.03 COORDINATION OF WORK

A. The Contractor shall verify clearance requirements of all electrical and mechanical equipment/systems prior to the installation of any new work. Electrical equipment, wiring, systems, etc. shall not interfere with mechanical equipment spaces. The Contractor shall coordinate his work to obtain symmetry in ceiling layouts, so that sprinkler heads, lights, diffusers, etc. are coordinated and are installed per the Architectural reflected ceiling plan.

B. The Contractor, and his Subcontractors, shall be responsible for all tasks applicable to their work in accordance with the Specifications, Drawings, and code requirements, and shall be responsible for coordinating locations and arrangements of their work to give best results with all other relevant trades.

1. Coordinate his work to obtain symmetry in ceiling layouts, so that sprinkler heads, lights, diffusers, etc. are coordinated and are installed per the Architectural reflected ceiling plan.
2. Coordinate all wall, roof, floor penetrations, equipment pads, equipment locations, system routings, etc. with architectural and structural trades.
3. Verify requirements of all equipment with shop drawing submittals prior to installation - notify Architect/Engineer of any conflicts between shop drawings and plans.
4. Coordinate rough-in locations and mounting heights of all devices with locations/heights of countertops/sinks/furniture/cabinets/etc. with Architectural Elevations and other trades prior to rough-in.
5. Coordinate rough-in locations of mechanical control devices (i.e. thermostats, sensors, etc.) with mechanical trades. E.C shall provide rough-in of box for T-stat/Sensor and conduit pathway from box to mechanical unit's control box, for wiring by M.C and/or T.C.. T-stats shall be located @ 48" AFF unless noted otherwise.
6. Coordinate locations of electrical items that require access (i.e. panelboards, starters, pull boxes, etc.) with reflected ceiling plan. Items located above hard non-accessible ceilings shall be provided with access doors as required.
7. Do not route/locate below grade conduits below, or with 45 degrees of the bottom corner of, foundation walls/footings. Coordinate with structural trades prior to rough-in.
8. Verify clearance requirements of all electrical and mechanical equipment/systems prior to the installation of any new work. Electrical equipment, lighting, conduit, systems, etc. shall not interfere with mechanical equipment spaces. Mechanical equipment, piping, ductwork, systems, etc. shall not interfere with electrical equipment spaces.

1.04 INSPECTION OF SITE AND PROJECT DOCUMENTATION

A. The Contractor shall visit the site and examine/verify the conditions under which the work must be conducted before submitting proposal. The Contractor shall examine the drawings and specifications of all other trades including Mechanical, Architectural, Structural, Plumbing, and Electrical.

B. The submitting of a proposal implies that the Contractor has visited the site, examined all contract documents, and understands the conditions under which the work must be conducted.

C. The Contractor shall notify the Architect and/or Engineer, via written RFI prior to submitting his bid, of any potential conflicts/problems with the plans that he has identified during his inspection of the site and/or from the review of plans/specifications. RFIs must be submitted at least 5 working days prior to bid opening.

1.05 GENERAL SUPPORT REQUIREMENTS

A. Provide all necessary angle/brackets or supplementary steel as required for adequate support for all conduit, lighting, specialties, and equipment. Secure approval form Architect and/or

Structural Engineer, in writing, before welding or bolting to steel framing or anchoring to concrete structure, or cutting/coring thru structural systems.

B. Where conduit or equipment is supported or suspended from concrete construction, provide approved concrete inserts in formwork to receive hanger rods, such as Unistrut or Powerstrut, and where installed in metal deck, use Ramset or Welds as required.

1.06 GUARANTEE

A. Contractor shall guarantee that all labor, materials, and equipment are free from defects and agrees to replace or repair any part of this installation which becomes defective within a period of one year from the date of substantial completion following final acceptance, provided that such failure is due to defects in the equipment, material or installation. Acceptance date of substantial completion shall be Owner occupancy as determined by the Architect and/or Engineer.

B. The Contractor shall file with the Owner one set of guarantees from the equipment manufacturers including the operating conditions and performance capacities they are based on.

1.07 CODES, PERMITS AND FEES

A. Refer to Division 1, General Requirements and Supplementary Conditions.

B. Unless otherwise indicated, all required permits, plan reviews, licenses, inspections, approvals and fees for electrical work shall be secured and paid for by the Contractor.

C. All work shall be executed in accordance with the latest enforceable rules and regulations set forth in local and state codes.

1. Electrical systems shall be installed per the Owner's current jurisdictional codes (Michigan Electrical Code, Michigan Energy Code, etc.), current NFPA codes (NFPA 101, NPFA 90, NFPA 72, etc.), and applicable sections of the Michigan Building Code. Coordinate Owner's current codes with Owner's representative prior to work.

D. In the event that the plans and specifications conflict with any rules, regulations, or codes applying, said rules, regulations and codes shall govern.

E. Where the drawings and/or specifications indicate materials or construction in excess of code requirements, the drawings and/or specifications shall govern.

F. Contractor shall prepare any detailed drawings or diagrams which may be required by the governing authorities (i.e. fire alarm plans, etc.).

1.08 UTILITIES

A. The Contractor shall be responsible for coordinating, obtaining service, and advising the Engineer, and utility company(s) for the electrical and telephone service installations.

B. Rules of local utility companies shall be complied with. The Contractor shall check with each utility company supplying service to the installation (i.e. power, phone, data, cable) and coordinate service requirements including, but not limited to, all transformers, meter boxes and meters which will be required. The Contractor shall provide an allowance for all required utility costs in his bid.

C. In the event that the plans and specifications conflict with any utility rules applying, said utility rules and regulations shall govern.

1.09 SUBSTITUTION ITEMS REQUIRING PRIOR APPROVAL

A. All items that the Contractor proposes to use in the work, that are not specifically named in the contract documents, must be submitted for review/approval. Such items must be submitted in duplicate to the Architect and/or Engineer for approval a minimum of ten (10) days prior to bid opening. Requests for prior approval must be accompanied by complete catalog information,

including but not limited to, model, size, accessories, complete electrical information and performance data in the form given in the equipment schedule on the drawings at stated design conditions. Where items are referred to by symbolic designations on the drawings, all requests for prior approval shall bear the same designations.

B. Lighting Substitutions:

1. Furnish lighting fixtures as scheduled on drawings.

2. Lighting fixture substitutions may be considered for approval by the Architect and/or Engineer only if all of the following criteria are met:

a. Provide specification cut sheets marked-up to clearly identify the proposed luminaire including features, options, accessories, etc. required to match products indicated in the schedules.

1.10 MATERIAL AND EQUIPMENT MANUFACTURERS

A. All items of equipment shall be furnished complete with all accessories normally supplied with the catalog items listed and all other accessories necessary for a complete and satisfactory operating system. All equipment and materials shall be new and shall be standard products of manufacturers regularly engaged in the production of electrical equipment and shall be the manufacturer's latest design.

B. If equipment by an approved manufacture is other than the equipment specified as the basis of design the substituted equipment shall be equal in quality, durability, appearance, capacity and efficiency through all ranges of operation, shall conform with arrangements and space limitations of the equipment shown on the plans and/or specified, shall be compatible with the other components of the system and shall comply with the requirements for Substitution Items Requiring Prior Approval specified in this Section of the Specifications. All costs to make these items of equipment comply with original requirements including, but not limited to, conduit, wiring, bus work, enclosures, and building alterations shall be included in the original bid.

1.11 OPERATION AND MAINTENANCE INSTRUCTIONAL MANUALS

A. Refer to Division 1, General Requirements.

B. Provide compete maintenance and operating instructional manuals covering all electrical equipment as specified herein, and individual equipment specification sections.

C. The O&M data shall be bound in a suitable number of 3" or 4", 3-ring, hard cover binders. Permanently imprinted on the cover shall be the words, "Manufacturer's Operation and Maintenance Data", project title, location of project, and the date. A table of contents shall be provided in the front of each binder.

D. Maintenance and operating instructional manuals shall be job specific to this project. Generic manuals are not acceptable. Each piece of equipment in the O&M manual shall be identified as identified on the project drawings (i.e. Main Distribution Panel MDP, Light Fixture F1, etc.).

E. Internally subdivide the binder contents with permanent page dividers, organized by major equipment/systems (i.e. Fire Alarm, Distribution Equipment, Wiring Devices, Light Fixtures, etc.)

F. Contents: Each volume of O&M manual shall have three parts:

1. Part 1: A directory listing names, addresses, and telephone numbers of Architect/Engineer, Contractor, Subcontractors, and major equipment suppliers.

2. Part 2: O&M data, arranged and subdivided by major equipment/systems. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers:

a. List of equipment.

b. Copies of Shop drawings and product data, approved by Architect/Engineer.

c. Installation and operational procedures.

d. Routine maintenance procedures.

e. Trouble shooting procedures.

f. Complete parts lists by nomenclature, manufacturer's part number and use.

g. Recommended spare parts lists.

h. Lubrication chart listing all types of lubricants to be used for each piece of equipment and the recommended frequency of lubrication.

i. Complete wiring and schematic diagrams.

j. Elevations and/or sections cut through all of the major equipment and sub-assemblies.

3. Part 3: Project documents and certificates, including the following: Shop drawings.

a. Warranty certificates.

b. Copies of approved construction permits.

c. Contractor's and equipment manufacturer's telephone numbers for warranty repair services.

G. Two (2) Maintenance and Operating manuals shall be provided to the Architect and/or Engineer for review when construction is 75% complete.

H. A minimum of two (2) copies of all approved Operation and Maintenance literature shall be furnished to the Owner within 10 days after final inspection. O&M manuals must be completed prior to start of Owner training as the manuals shall be used as the basis of the training.

1.12 SHOP DRAWINGS

A. Refer to Division 1, General Requirements.

B. All shop drawings shall be submitted in groupings of similar and/or related items. Incomplete submittal groupings will be returned unchecked.

C. Unless noted otherwise, submit electronically in digital .pdf form, copies of complete manufacturer's shop drawings for all electrical equipment, or systems, including but not limited to, the items listed below. Where items are referred to by symbolic designation on the drawings and specifications, all submittals shall bear the same designation. Refer to other Sections of the electrical specifications for additional requirements.

1. Panelboards

2. Wiring Devices

3. Lighting Fixtures

4. Lighting Control Equipment

5. Generator & Automatic Transfer Switch

6. Fire Alarm System

1.13 INSTRUCTION OF OWNER PERSONNEL

A. Before final inspection the Contractor shall instruct Owner's designated personnel in operation, adjustment and maintenance of electrical equipment and systems at agreed upon times.

B. For equipment requiring seasonal operation, perform instructions for other seasons within six months.

C. Use Operation and Maintenance Manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

D. Prepare and insert additional data in Operation and Maintenance Manual when need for such data becomes apparent during instruction.

1.14 RECORD DRAWINGS

A. Contractor shall submit to the Architect and/or Engineer, record drawings which have been neatly marked to represent as-built conditions for all new electrical work.

B. The Contractor shall keep accurate note of all deviations from the construction documents and discrepancies in the concealed conditions and other items of construction on field drawings as they occur. Proper circuiting, conduit runs, location and number of electrical devices shall be indicated on the "as-built" drawings. The marked up field documents shall be available for review by the Architect, Engineer and Owner at their request.

PART 2 PRODUCTS

2.01 MATERIALS

A. All material and equipment furnished and installed by the Contractor for the permanent Work shall be new, unused, of the best quality of make specified, shall be free from defects of any character, and shall be listed as approved by the UL and/or FM.

B. Outdoor electrical equipment shall be weatherproof, NEMA 3R or 4X (stainless steel), unless otherwise indicated.

C. Unless otherwise specified in other Division 26 sections, the sheet metal surfaces of equipment enclosures shall be coated with a rust resisting primer. Over the primer, a corrosion resistant baked enamel finish shall be applied. The color shall be ASA No. 49, medium light gray.

PART 3 EXECUTION

3.01 INSTALLATION OF EQUIPMENT

A. Install equipment in strict accordance with all directions and recommendations furnished by the manufacturer. Where such directions are in conflict with the drawings and specifications, report such conflicts to the Architect and/or Engineer for resolution.

3.02 DEMOLITION AND REMOVAL WORK

A. All demolition of existing electrical equipment and materials shall be done by the Contractor unless otherwise indicated.

B. In general, demolition work is indicated on the drawings. However, the Contractor shall visit the job to determine the full extent and character of this work.

C. The Contractor shall review all other contract documents (i.e. architectural plans, mechanical plans, etc.) to review the extent of demolition and remodeling work.

D. Unless specifically noted, removed materials shall not be reused in the work. Salvaged materials that are to be reused shall be stored safe against damage and turned over to the appropriate trade for reuse. Salvaged materials of value that are not to be reused shall remain the property of the Owner unless such ownership is waived. Remove items from the systems and turn over to the Owner unless such ownership is waived. Items on which the Owner waives ownership shall become the property of the Contractor, who shall remove and legally dispose of same, away from the premises. Properly dispose of lighting fixture lamps and ballasts.

E. Work that has been cut or partially removed shall be protected against damage until covered by permanent construction.

F. Where equipment or fixtures are removed, wire shall be removed, outlets shall be properly blanked off, and conduits capped. After alterations are done, the entire installation shall present

a "finished" look, as approved by the Architect and/or Engineer. The original function of the existing electrical work to be modified shall not be changed unless required by the specific revisions shown on the drawings.

G. The Contractor is required to maintain service by rerouting wiring for power and lights as necessary. Where walls and ceilings are to be removed as shown on the drawings, the conduit is to be cut off by the Electrical Trades so that the abandoned conduit in these walls and ceilings may be removed with the walls and ceilings by the Architectural Trades. All dead-end conduit runs shall be plugged at the remaining line outlet boxes or the panels.

H. Where new walls, ceilings, and/or floors are installed which interfere with existing outlets, devices, etc., which are to remain, the Electrical Trades shall adjust, extend and reconnect such items as required to maintain continuity of same.

I. Where devices on existing walls are no longer active, but wires feeding outlets are active, provide blank cover plates and box extensions are required to meet new finishes. Where devices and wires feeding them are no longer active, fill outlet boxes with plaster for finishing by others.

J. Where circuits, conduit, boxes, etc. are no longer used/in service they shall be entirely removed back to the panel (source of power).

K. Where shown as to use existing circuits and equipment in remodeled areas, the Contractor shall verify circuit identification, circuit loads, and as-build methods of installation to complete the demolition and new work in accordance with current codes.

L. Conceal all electrical work wherever possible. Use of surface raceway ("Wiremold") or exposed conduits will be permitted only where approved by the Architect and/or Engineer.

M. Existing lighting shall be reused where indicated on plans. Reused fixtures shall be cleaned, re-lamped and reconditioned for satisfactory operation and appearance.

3.03 WORK IN EXISTING BUILDINGS

A. The Owner will provide access to existing buildings as required. Access requirements to occupied buildings shall be identified on the project schedule. The Contractor, once work is started in the existing building, shall complete same work without interruption so as to return work areas as soon as possible to Owner.

B. Adequately protect and preserve all existing and newly installed work. The Contractor shall repair any damages that they are responsible for at their expense .

C. Consult with the Architect and/or Engineer as to the methods of carrying on the work so as not to interfere with the Owner's operation any more than absolutely necessary. Accordingly, all service lines shall be kept in operation as long as possible and the services shall only be interrupted at such time as will be designated by the Architect, Engineer, and/or Owner's Representative.

3.04 CHASE, SHAFTS AND RECESSES

A. Coordinate with architectural and other trades to ensure accurate location and size of chases, shafts and recesses.

3.05 CUTTING, CORING AND PATCHING

A. Refer to General Conditions

B. The Contractor shall perform all cutting, coring, and patching that may be necessary for the installation of their Work. All cutting, coring, patching and repair work shall be performed by the Contractor through qualified Subcontractors. Contractor shall include full cost of same in his bid.

C. Secure approval form Architect and/or Structural Engineer, in writing, before cutting, welding/bolting to, or anchoring from any structural building components (i.e. structural steel, load bearing walls, footings/foundations, concrete floors/ceilings, etc.).

3.06 EXCAVATION AND BACKFILLING

A. Provide all excavation, trenching, tunneling and backfilling required for the electrical work.

B. Where conduit is installed less than 2'6" below the surface of pavement, provide concrete encasement, 4" minimum coverage, all around or as shown on the electrical drawings.

C. Install warning tape for all buried circuits.

D. Refer to Architectural, Structural, and Site/Civil Specification sections for excavation and backfilling details.

3.07 EQUIPMENT FOUNDATIONS AND SUPPORTS

A. Shall be as required for equipment mounting or as shown on plans.

B. Provide concrete housekeeping pads for floor mounted electrical equipment through approved, qualified concrete subcontractors. Concrete housekeeping pads shall be poured before equipment is installed, with anchor bolts and sleeves to fit machine base. Refer to structural plans/specifications for pad details. Contractor shall include full cost of concrete housekeeping pads in his bid.

C. Coordinate concrete housekeeping pads to insure correct size, location, anchor bolts and sleeves.

D. For equipment suspended from ceiling or walls, furnish and install all inserts, rods, structural steel frames, brackets and platforms required. Obtain approval of Architect and/or Structural Engineer for same including loads, locations, and methods of attachment.

3.08 SLEEVES

A. Provide and install Schedule 40 black steel pipe sleeves, cut to length, wherever conduits pass through above grade walls and floors. Provide and install galvanized steel pipe sleeves, cut to length, wherever conduits pass through below grade foundation walls and slab on grade floors. Sleeves shall terminate flush with walls in finished areas. All sleeves through the floor are to extend two (2) inches above finish floor.

B. Provide escutcheons at each penetration through walls, floors, and ceilings in exposed areas.

C. Patch sleeves to match building material.

3.09 SEALING OF ELECTRICAL OPENINGS

A. Seal the space around conduits in sleeves through walls, floors and ceilings.

B. Provide adequate clearance to allow for proper sealing.

C. Provide/install fireproof wall and floor sleeves as required at all applicable wall, ceiling, and floor penetrations. Refer to Architectural plans for wall assembly ratings.

D. Sleeves placed in floors shall be flush with the underside of the floor construction and shall have planed, square ends, extending 2 inches above the finished floor, unless otherwise noted or detailed.

E. Where sleeves pass through reinforced concrete floors, they shall be properly set in position prior to concrete pouring in such a way that they will be maintained in position until the concrete is set.

F. Conduits passing through below grade perimeter walls or slabs on grade shall have the space between the pipe and sleeve sealed watertight with a mechanically expandable elastomer seal device.

3.10 FIRESTOP MATERIALS

A. Use only firestop products that have been tested according to ASTM E-814 and UL 1479 for the

conditions set forth regarding construction assembly type, penetrating item type, annular space requirements and fire rating.

B. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods specified in other related specification sections.

1. For non-combustible penetrations including conduit not passing through a sleeve, the following materials are acceptable:

   a. Hilti FS 601 Elastmeric Firestop Sealant.

   b. 3 M.

   c. CSD Sealing Systems.

   d. Firestop Systems.

2. For non-combustible penetrations including sleeved conduits, the following materials are acceptable:

   a. Hilti FS 601 Elastmeric Firestop Sealant.

   b. 3 M.

   c. CSD Sealing Systems.

   d. Firestop Systems.

3. For combustible penetrations including cables and cable bundles, the following materials are acceptable:

   a. Hilti FS 611A Intumescent Firestop Sealant.

   b. 3 M.

   c. CSD Sealing Systems.

   d. Firestop Systems.

4. For large or complex penetrations involving multiple conduits, cable trays, electrical bussway, etc. the following materials are acceptable:

   a. Hilti FS 635 Firestop Compound.

   b. 3 M.

   c. CSD Sealing Systems.

   d. International Protective Coatings - KBS Sealbags.

3.11 EQUIPMENT CONNECTIONS

A. Make connections to equipment, fixtures and other items included in the work in accordance with the approved shop drawings and rough-in measurements furnished by the manufactures of the particular equipment furnished. All additional connections not shown on the drawings, but called out by the equipment manufacturer's shop drawings, shall be provided at no additional cost.

3.12 CLEANING

A. Each Trade shall be responsible for removing all debris daily as required to maintain the work area in a neat, orderly condition.

B. Final cleanup shall include, but not be limited to, washing of fixture lenses or louvers, switchboards, substations, motor control centers, panels, etc. Fixture reflectors and lenses or louvers shall be left with no water marks or cleaning streaks.

3.13 INSTALLATION IN PLENUM SPACES

A. Equipment and systems installed in mechanical return air plenum spaces shall of non-combustible materials which meet building code required smoke and flame spread ratings.

B. Coordinate location of mechanical plenum spaces with mechanical trades for plenum rated cable requirements.

3.14 PAINTING

A. All electrical systems, equipment, conduit, etc. exposed in finished areas and on building exterior shall be painted to match the surrounding finishes. Refer to specification section 09900 - Coordinate color with Architect

3.15 PROTECTION AND HANDLING OF EQUIPMENT AND MATERIALS

A. Equipment and materials shall be protected from theft, injury or damage.

B. Protect equipment outlets, pipe and duct openings with temporary plugs or caps.

C. Provide adequate storage for all equipment and materials delivered to the job site. Equipment set in place in unprotected areas must be provided with temporary protection.

3.16 ACCESSIBILITY

A. All equipment shall be installed so as to be readily accessible for operation, maintenance, and repair, as required by the equipment manufacturer and as subject to the approval of the Engineer.

3.18 ACCESS DOORS

A. The Contractor, and/or his Subcontractors, shall provide access doors for access to any of their respective electrical equipment that is installed in inaccessible areas. Provide access doors in the walls, as required to make all electrical boxes, controls and other equipment installed by the Contractor accessible. In the walls, provide Milcor No. "DW" or "M" as required to make all equipment installed by the Contractor accessible. Minimum size 12 inches x 12 inches. In the ceiling, provide Milcor N. 3210, 3105 or 3206 for accessibility as mentioned above, 24 inches x 24 inches minimum size. The plaster or acoustical tile insert shall be by the architectural trades. Areas with accessible ceilings (ceilings where tiles are not fastened in place and can be individually removed without removal of adjacent tiles) will not require access doors.

B. Refer to Architectural specifications for manufacturer's and model numbers and additional information.

C. The Contractor, and/or his Subcontractors, shall be responsible for quantities of access doors and shall receive approval for locations from the Architect and/or Engineer prior to installation.

D. The Contractor, and/or his Subcontractors, shall purchase appropriate access doors, coordinate locations, and shall pay for installation by a qualified architectural subcontractor.

E. When access doors are in fire resistant walls or ceilings, they must bear the Underwriters' Laboratories, Inc., Label, with time design rating equal to or exceeding that of the wall or ceiling unless they were a part of the tested assembly.

3.19 NAMEPLATES AND DIRECTORIES

A. Identify switchgear, unit substations, motor controls, panelboards, safety switches, etc., with manufacturer's nameplate, shop order, where applicable on composite assemblies, and designations used on the Drawings. Nameplates shall be laminated phenolic plastic, beveled edged white with engraved black letters. Except where impractical, letter and numerals shall be a minimum of 1/2 inch high. Nameplates shall be mechanically secured. Pressure sensitive nameplates are not acceptable. Panel directories shall be neatly typed, showing equipment served and location for each breaker or switch with a clear plastic protective cover.

3.20 EXTRA WORK

A. Refer to Division 1, General Requirements.

B. For any extra electrical work which may be proposed, the Electrical Contractor shall furnish to the General Contractor/Construction Manager, an itemized breakdown of the estimated cost of all materials and labor required to complete this work. The estimate cost breakdown shall include unit prices (same prices for increase/decrease of work) for all materials (i.e. wire, conduit, devices, equipment, equipment rental, etc.) and all labor (i.e. manhours, overtime, etc.) which may be required for any proposed extra work. The Contractor shall not proceed until receiving a written order from the General Contractor establishing the agreed price and describing the work to be done.

3.21 DRAWINGS AND MEASUREMENTS

A. These specifications and accompanying drawings are intended to describe and provide for finished work. They are intended to be cooperative, and what is called for by either the drawings or specifications shall be as binding as if call for by both. The work herein described shall be complete in every detail.

B. The Drawings are not intended to be scaled for rough-in measurements, nor to serve as Shop Drawings. Field measurements necessary for ordering materials and fitting the installation to the building construction and arrangement shall be taken by the Contractor. The Contractor shall check latest architectural drawings to locate light switches, check latest structural drawings for interferences, etc.

3.22 FIELD QUALITY CONTROL

A. Equipment Start-Up

1. After completion of the installation, all systems and equipment shall be tested by the Contractor in the presence of the Owner's Representative and/or Engineer under actual operating conditions. Tests shall be performed according to manufacturer's recommendations.

2. The Contractor shall include with his bid the services of all required Equipment Manufacturer's field service technicians for a period necessary to complete the work to the satisfaction of the Engineer and Owner.

3. This service shall be for the purposes of check-out, initial start-up, certification, and instruction of plant personnel.

4. A written report covering the technician's findings and installation approval shall be submitted to the Engineer covering all inspections and outlining in detail any deficiencies noted.

5. Specific requirements, if any, for a particular system or piece of equipment are contained in the particular specification sections. The Contractor's responsibility relative to coordinating these services is contained in Section 01 7700, Closeout Procedures.

B. Manufacturer's Supervision and Field Installation Verification

1. Where specified, electrical equipment manufacturer shall furnish the services of an authorized representative especially trained and experienced in the installation of his equipment to

a. Supervise the equipment installation in accordance with the approved submittals and manufacturer's instructions.

b. Be present when the equipment is first put into operation.

c. Inspect, check, adjust as necessary, and approve the installation.

d. Repeat the inspection, checking, and adjusting until all trouble or defects are corrected and the equipment installation and operation are acceptable.

e. Prepare and submit the specified Manufacturers' Certified report. Include all costs for representative's services in the contract price.

C. Final Operation Tests

1. The Contractor shall test all electrical systems for not less than 16 hours, with no interruptions except for normal maintenance or corrective work. Conform to the approved test plan.

2. Testing Materials

a. The Contractor shall furnish labor, instruments, recorders, gages, materials, and power for tests as required.

3. Testing Methods

a. The Contractor shall operate systems continuously 24 hours a day under constant inspection of trained operators. Cause variable speed equipment to cycle through the applicable speed range at a steady rate or change. Induce simulated alarm and distressed operating conditions, and test controls and protective devices for correct operation.

END OF SECTION

SECTION 26 0519

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 V AND LESS)

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wire and cable for 600 volts and less.

B. Wiring connectors and connections.

1.02 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.

B. NFPA 70 - National Electrical Code; National Fire Protection Association.

1.03 SUBMITTALS

A. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency.

B. Project Record Documents: Record actual locations of components and circuits.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Furnish products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.05 PROJECT CONDITIONS

A. Verify that field measurements are as shown on the Drawings.

B. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

PART 2 PRODUCTS

2.01 WIRING REQUIREMENTS

A. Concealed Dry Interior Locations: Use only building wire in raceway or metal clad cable.

B. Exposed Dry Interior Locations: Use only building wire in raceway or building wire with Type THHN insulation in raceway.

C. Above Accessible Ceilings: Use only building wire in raceway or metal clad cable.

D. Exterior Locations: Use only building wire with Type THWN or XHHW insulation in raceway.

E. Underground Installations: Use only building wire with Type THWN or XHHW insulation in raceway.

F. Use stranded conductors for control circuits.

G. Use conductor not smaller than 10 AWG for power and lighting circuits.

H. Use conductor not smaller than 14 AWG for control circuits.

I. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet (25 m).

J. Use 8 AWG conductors for 30 ampere, 120 volt branch circuits longer than 75 feet.

K. Conductor sizes are based on copper unless indicated as aluminum or "AL".

L. All feeders not sized on the plans shall be sized by the CONTRACTOR for a maximum of 2% voltage drop. All branch circuits shall be sized for a maximum of 3% voltage drop.

2.02 WIRE MANUFACTURERS

A. Cerro Wire Inc.: www.cerrowire.com.

B. Industrial Wire & Cable, Inc.: www.iewc.com.

C. Southwire Company: www.southwire.com.

D. Royal.

E. Rome.

F. General Cable.

2.03 BUILDING WIRE

A. Description: Single conductor insulated wire.

B. Conductor: Copper. Class B strand per ICEA S-61-402.

C. Insulation Voltage Rating: 600 volts.

D. Insulation: NFPA 70.

1. For Feeders and Branch Circuits Equal to and Smaller Than 4/0 AWG (Dry and Damp locations): Type THHN rated 90 degrees C.

2. For Feeders and Branch Circuits Equal to and Smaller Than 4/0 AWG (Wet locations): Type THWN rated 90 degrees C.

3. For Feeders and Branch Circuits Larger Than 4/0 AWG (Dry and Damp locations): Type XHHW rated 90 degrees C.

E. Color Coding:

1. Branch circuits shall have their insulation color coded the entire length as noted below.

2. Feeder conductors shall have their ends taped, when entering junction boxes or panels, as noted below.

3. Color coding shall be as follows:

a. 208/120 volt, 3 phase, 4 wire:

1) grounded neutral - white

2) phase A hot leg - black

3) phase B hot leg - red

4) phase C hot leg - blue

5) ground - green

2.04 CONTROL WIRING

A. Control circuit, single conductor field wire shall be No. 14 AWG, stranded copper with 30 mil thick wall of cross linked polyethylene or polyvinyl chloride insulation rated to withstand a copper temperature of 90 degrees C. at 600 volts without deterioration. It shall meet applicable ICEA Standards.

B. Multi conductor control cable shall consist of individual conductors, No. 14 AWG, stranded copper with 30 mil thick wall of insulation rated to withstand a copper temperature of 75 degrees C without deterioration. The insulation shall be a 20 mil wall of polyethylene with a 10 mil thick

polyvinyl chloride jacket. The individual conductors shall be identified per Paragraph 5.6.3. of ICEA Publication No. S 61402 and shall be cabled together with suitable fillers and binder tape to give the completed cable a substantially circular cross section.

2.05 METAL CLAD CABLE (TYPE MC CABLE)

A. Description: NFPA 70, Type MC.

B. Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

D. Insulation Temperature Rating: 75 degrees C.

E. Insulation Material: Thermoplastic.

F. Armor Material: Steel.

G. Armor Design: Interlocked metal tape.

H. Fittings: Shall be specifically designed for use with type MC cable.

2.06 WIRING CONNECTORS

A. Split Bolt Connectors:

1. Manufacturers:

a. Black Burn.

b. T & B.

c. Burndy.

B. Solderless Pressure Connectors:

1. Manufacturers:

a. AMP.

b. T & B.

c. 3 M.

C. Spring Wire Connectors:

1. Manufacturers:

a. Buchanah Model B-Cap.

b. 3 M Model Scotchlok or Hyflex.

c. Panduit Model P-Conn.

D. Compression Connectors:

1. Manufacturers:

a. Neer.

b. T & B.

c. Appleton.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that mechanical work likely to damage wire and cable has been completed.

B. Verify that raceway installation is complete and supported.

C. Verify that field measurements are as indicated.

3.02 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.03 INSTALLATION

A. Install wire and cable securely, in a neat and workmanlike manner, as specified in NECA 1.

B. Route wire and cable as required to meet project conditions.

1. Wire and cable routing indicated is approximate unless dimensioned.
2. Where wire and cable destination is indicated and routing is not shown, determine exact routing and lengths required.

C. All wiring shall be installed in conduit or approved raceway. All raceways shall be provided with a ground conductor unless noted otherwise.

D. Pull all conductors into raceway at same time.

E. Use suitable wire pulling lubricant for building wire 4 AWG and larger.

F. Protect exposed cable from damage.

G. Support cables above accessible ceiling, using spring metal clips or metal cable ties to support cables from structure. Do not rest cable on ceiling panels.

H. Use suitable cable fittings and connectors.

I. Neatly train and lace wiring inside boxes, equipment, and panelboards.

J. Clean conductor surfaces before installing lugs and connectors.

K. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.

L. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.

M. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.

N. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

O. Identify and color code wire and cable under provisions of Section 26 0553. Identify each conductor with its circuit number or other designation indicated.

P. Branch circuits may be combined up to 8 conductors (A-phase, B-phase, C-phase, neutral and A-phase, B-phase, C-phase, neutral) and 2 ground conductors in conduit. Contractor shall be responsible for derating conductors as required by N.E.C Article 310, Note 8.

Q. Do not share neutral conductor on load side of dimmers.

R. Branch circuit neutral conductors: The use of multi-wire branch circuits with a common neutral is not permitted. Each branch circuit shall be furnished and installed with an accompanying neutral conductor sized the same as the phase conductor.

END OF SECTION

SECTION 26 0526

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Grounding and bonding components.

B. Provide all components necessary to complete the grounding system(s) consisting of:

1. Existing metal underground water pipe.
2. Rod electrodes.

1.02 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code; National Fire Protection Association.

B. NFPA 99 - Standard for Health Care Facilities; National Fire Protection Association.

1.03 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 5 ohms.

1.04 SUBMITTALS

A. Test Reports: Indicate overall resistance to ground and resistance of each electrode.

B. Project Record Documents: Record actual locations of components and grounding electrodes.

C. Certificate of Compliance: Indicate approval of installation by authority having jurisdiction.

1.05 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years documented experience with service facilities within 100 miles of Project.

C. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

D. The Contractor shall be responsible for providing all grounding required in accordance with NEC and local code requirements. Grounding shown on the plans is minimum required.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Cooper Power Systems: www.cooperpower.com.

B. Framatome Connectors International: www.fciconnect.com.

C. Lightning Master Corporation: www.lightningmaster.com.

D. American Electric.

E. Chance.

F. Burndy.

G. Cadweld.

2.02 GENERAL

A. The contractor shall install a grounding system in accordance with the drawings, specifications, and with the National Electrical Code, NEMA, USASI, and IEEE Standards, latest editions. The ground bar at the main service disconnect shall be bonded to the water mains, structural steel, and driven ground rods, by grounding electricode conductors. Maximum grounding resistance shall be achieved per NEC requirements.

2.03 ELECTRODES

A. Manufacturers:

1. Cooper Power Systems: www.cooperpower.com.
2. Framatome Connectors International: www.fciconnect.com.
3. Lightning Master Corporation: www.lightningmaster.com.
4. Chance.
5. American Electric - Blackburn.

B. Rod Electrodes: Copper-clad steel.

1. Diameter: 3/4 inch (19 mm).
2. Length: 10 feet (3000 mm).

2.04 CONNECTORS AND ACCESSORIES

A. Mechanical Connectors: Bronze.

1. Manufacturers: Chance, Burndy, American Electric - Blackburn.

B. Exothermic Connections:

1. Product: Cadweld.

C. Wire: Stranded copper.

D. Foundation Electrodes: #2/0 AWG minimum.

E. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions prior to beginning work.

B. Verify that final backfill and compaction has been completed before driving rod electrodes.

3.02 INSTALLATION

A. Install ground electrodes at locations indicated. Install additional rod electrodes as required to achieve specified resistance to ground.

B. Provide bonding to meet requirements described in Quality Assurance.

C. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

D. Ground cables shall be protected by sleeves where the cables extend through a concrete surface. Ground inserts shall be used where ground cables extending through the surface would be exposed to damage during or after construction.

E. Where ground cables are installed in metallic conduit, the cables shall be bonded to the conduit at both ends of the run.

F. Welds on ground cables shall be cleaned and painted with an asphalt base paint where buried underground or imbedded in concrete.

G. Install a minimum #12 AWG green grounding wire for each branch circuit. The grounding wire shall be connected to the grounding terminal bus bars in panelboards, and these bars shall be grounded to the building's grounding system.

H. Circuits run in PVC conduit shall have a separate ground wire.

END OF SECTION

SECTION 26 0529

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Conduit and equipment supports.

B. Anchors and fasteners.

1.02 REFERENCE STANDARDS

A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.

B. NFPA 70 - National Electrical Code; National Fire Protection Association.

1.03 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

PART 2 PRODUCTS

2.01 MATERIALS

A. Hangers, Supports, Anchors, and Fasteners - General: Corrosion-resistant materials of size and type adequate to carry the loads of equipment and conduit, including weight of wire in conduit.

B. Supports: Fabricated of structural steel or formed steel members; galvanized. All structural supports and channels shall be manufactured from a minimum of #16 gauge ASTM A570 grade 33 steel.

C. Anchors and Fasteners:

1. Do not use spring clips.
2. Obtain permission from ENGINEER before using powder-actuated anchors.
3. Concrete Structural Elements: Use precast inserts, expansion anchors, or preset inserts.
4. Steel Structural Elements: Use beam clamps or welded fasteners.
5. Concrete Surfaces: Use expansion anchors.
6. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use hollow wall fasteners.
7. Solid Masonry Walls: Use expansion anchors or preset inserts.
8. Sheet Metal: Use sheet metal screws.
9. Wood Elements: Use wood screws.

D. Formed Steel Channel:

1. Product: B-Line Strut.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install hangers and supports as required to adequately and securely support electrical system

components, in a neat and workmanlike manner, as specified in NECA 1.

1. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
2. Obtain permission from Engineer before drilling or cutting structural members.

B. Rigidly weld support members or use hexagon-head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.

C. Install surface-mounted cabinets and panelboards with minimum of four anchors.

D. In wet and damp locations use steel channel supports to stand cabinets and panelboards 1 inch off wall.

E. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.

END OF SECTION

SECTION 26 0534

CONDUIT

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Conduit, fittings and conduit bodies.

1.02 REFERENCE STANDARDS

A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC).

B. ANSI C80.3 - American National Standard for Steel Electrical Metallic Tubing (EMT).

C. ANSI C80.5 - American National Standard for Electrical Rigid Aluminum Conduit (ERAC).

D. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.

E. NECA 101 - Standard for Installing Steel Conduit (Rigid, IMC, EMT); National Electrical Contractors Association.

F. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association.

G. NEMA RN 1 - Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit; National Electrical Manufacturers Association.

H. NEMA TC 2 - Electrical Polyvinyl Chloride (PVC) Tubing and Conduit; National Electrical Manufacturers Association.

I. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing; National Electrical Manufacturers Association.

J. NFPA 70 - National Electrical Code; National Fire Protection Association.

1.03 SUBMITTALS

A. Project Record Documents: Accurately record actual routing of conduits larger than 2 inches (51 mm).

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Accept conduit on site. Inspect for damage.

B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

C. Protect PVC conduit from sunlight.

1.06 PROJECT CONDITIONS

A. Verify that field measurements are as shown on the drawings.

B. Verify routing and termination locations of conduit prior to rough-in.

C. Conduit routing shown on Drawings in approximate locations unless dimensioned. Route as

required to complete wiring system.

D. Coordinate painting requirements of exposed conduit in finished areas and exterior of building with specification section 09900 and color with Architect.

PART 2 PRODUCTS

2.01 CONDUIT REQUIREMENTS

A. Conduit Size: Comply with NFPA 70.

1. Minimum Size: 3/4 inch (19 mm) where concealed within unaccessible construction (i.e. within walls, above drywall ceilings, etc.), 1/2" minimum elsewhere.

B. Underground Installations:

1. More than 5 Feet (1.5 Meters) from Foundation Wall: Use galvanized rigid steel conduit, thickwall nonmetallic conduit, thinwall nonmetallic conduit.
2. Within 5 Feet (1.5 Meters) from Foundation Wall: Use galvanized rigid steel conduit, thickwall nonmetallic conduit.
3. In or Under Slab on Grade: Use galvanized rigid steel conduit, thickwall nonmetallic conduit.
4. Minimum Size: 1 inch (25 mm).

C. Outdoor Locations Above Grade: Use galvanized rigid steel.

D. Dry Locations:

1. Concealed: Use galvanized rigid steel conduit or electrical metallic tubing.
2. Exposed: Use galvanized rigid steel conduit or electrical metallic tubing. Note: use Galvanized Rigid Steel (GRS) conduit where exposed/subject to damage (i.e. Mechanical Rooms, etc.) up to 10 feet above finished floor. Use electrical metallic tubing above 10 feet above finished floor.

E. Transformer and Motor Connections:

1. Liquidtight flexible metal conduit (maximum length shall be 3'-0").

F. Lighting fixtures:

1. From junction box to lighting fixture shall be flexible metal conduit (maximum length shall be 5'-0").

G. AC/MC Cable:

1. Use for concealed branch circuit drops to devices or light fixtures. Do not use AC/MC cable for homeruns to panelboards.

H. Control Wiring (fire alarm, bell systems, paging systems, sound systems, security systems, temperature controls systems):

1. Use electrical metallic tubing, except when making final connection to moving equipment where flexible conduit or sealtite should be used.

2.02 METAL CONDUIT

A. Manufacturers:

1. Allied Tube & Conduit: www.alliedtube.com.
2. Beck Manufacturing, Inc.: www.beckmfg.com.
3. Wheatland Tube Company: www.wheatland.com.

4. Century.

B. Rigid Steel Conduit: ANSI C80.1. Galvanized Rigid Steel (GRS).

C. Rigid Aluminum Conduit: ANSI C80.5.

D. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

1. Connectors and couplings shall be threaded, set-screw, or compression type, and concrete tight and/or rain tight where required.

2. Locknuts shall be malleable iron or steel. Bushings shall be malleable iron, steel, or plastic. Malleable iron or steel bushings shall be zinc or cadmium plated and shall have insulating insert of thermostatic plastic molded and locked into bushing ring. Plastic bushings shall be thermostatic phenolic insulating type. Use of non-rigid plastic bushings is prohibited.

2.03 FLEXIBLE METAL CONDUIT

A. Manufacturers:

1. AFC Cable Systems, Inc.: www.afcweb.com.

2. Electri-Flex Company: www.electriflex.com.

3. International Metal Hose: www.metalhose.com.

B. Description: Interlocked steel construction.

C. Fittings: NEMA FB 1. cast fittings.

D. Flexible metal conduit shall have a separate grounding conductor.

2.04 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Manufacturers:

1. AFC Cable Systems, Inc.: www.afcweb.com.

2. Electri-Flex Company: www.electriflex.com.

3. International Metal Hose: www.metalhose.com.

4. Anaconda Type "UA" for less than 1-1/4" and Type "EF" for larger than 1-1/2".

B. Description: Interlocked steel construction with PVC jacket.

C. Fittings: NEMA FB 1. cast fittings.

D. Flexible metal conduit shall have a separate grounding conductor.

2.05 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:

1. Allied Tube & Conduit: www.alliedtube.com.

2. Beck Manufacturing, Inc.: www.beckmfg.com.

3. Wheatland Tube Company: www.wheatland.com.

B. Description: ANSI C80.3; galvanized tubing.

C. Fittings and Conduit Bodies: NEMA FB 1; steel or malleable iron set screw type.

1. Connectors and couplings shall be threaded, set-screw, or compression type, and concrete tight and/or rain tight where required.

2. Locknuts shall be malleable iron or steel. Bushings shall be malleable iron, steel, or plastic. Malleable iron or steel bushings shall be zinc or cadmium plated and shall have insulating insert of thermostatic plastic molded and locked into bushing ring. Plastic bushings shall be

thermostatic phenolic insulating type. Use of non-rigid plastic bushings is prohibited.

2.06 NONMETALLIC CONDUIT

A. Manufacturers:

1. AFC Cable Systems, Inc.: www.afcweb.com.
2. Electri-Flex Company: www.electriflex.com.
3. Carlon.

B. Description: NEMA TC 2; Schedule 40 = Thinwall; 80 = Thickwall PVC.

C. Fittings and Conduit Bodies: NEMA TC 3.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify routing and termination locations of conduit prior to rough-in.

B. Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

3.02 INSTALLATION

A. Install conduit securely, in a neat and workmanlike manner, as specified in NECA 1.

B. Install steel conduit as specified in NECA 101.

C. Install nonmetallic conduit in accordance with manufacturer's instructions.

D. Arrange supports to prevent misalignment during wiring installation.

E. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.

F. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits.

G. Fasten conduit supports to building structure and surfaces under provisions of Section 26 0529.

H. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.

I. Do not attach conduit to ceiling support wires.

J. Arrange conduit to maintain headroom and present neat appearance.

K. Route exposed conduit parallel and perpendicular to walls.

L. Route conduit installed above accessible ceilings parallel and perpendicular to walls.

M. Maintain adequate clearance between conduit and piping.

N. Maintain 12 inch (300 mm) clearance between conduit and surfaces with temperatures exceeding 104 degrees F (40 degrees C).

O. Cut conduit square using saw or pipecutter; de-burr cut ends.

P. Bring conduit to shoulder of fittings; fasten securely.

Q. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.

R. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations, and to cast boxes.

S. Install no more than equivalent of three 90 degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2 inch (50 mm) size. Elbows larger than 3" dia. shall be long radius elbows.

T. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.

U. Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic, control, and expansion joints.

V. Provide suitable pull string in each empty conduit except sleeves and nipples.

W. Use suitable caps to protect installed conduit against entrance of dirt and moisture.

X. Ground and bond conduit under provisions of Section 26 0526.

Y. Identify conduit under provisions of Section 26 0553.

Z. Underground exterior conduits shall be sloped away from the building at a minimum of 4" per 100' or 0.33%.

AA. Install insulating bushings at open ends of telephone, data, video, security, etc. conduits.

BB. Drawstrings shall be provided for all new empty conduits. Drawstring shall be wax impregnated, nylon, or other synthetic material resistant to moisture and mildew to prevent deterioration.

CC. All underground conduits and/or duct banks shall be installed 24" minimum below grade (unless noted otherwise) and shall slope minimum of 0.33% to manholes, handholes, cable vaults, or other structures.

3.03 FIRESTOPPING

A. Use only firestop products that have been tested according to ASTM E-814 and UL 1479 for the conditions set forth regarding construction assembly type, penetrating item type, annular space requirements and fire rating.

B. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

1. For non-combustible penetrations including conduit not passing through a sleeve, the following materials are acceptable:

   a. Hilti FS 601 Elastmeric Firestop Sealant.

   b. 3 M.

   c. CSD Sealing Systems.

   d. Firestop Systems.

2. For non-combustible penetrations including sleeved conduits, the following materials are acceptable:

   a. Hilti FS 601 Elastmeric Firestop Sealant.

   b. 3 M.

   c. CSD Sealing Systems.

   d. Firestop Systems.

3. For combustible penetrations including cables and cable bundles, the following materials are acceptable:

   a. Hilti FS 611A Intumescent Firestop Sealant.

   b. 3 M.

   c. CSD Sealing Systems.

d. Firestop Systems.

4. For large or complex penetrations involving multiple conduits, cable trays, electrical bussway, etc. the following materials are acceptable:

a. Hilti FS 635 Firestop Compound.

b. 3 M.

c. CSD Sealing Systems.

d. International Protective Coatings - KBS Sealbags.

3.04 PAINTING

A. All conduit exposed in finished areas and building exterior shall be painted to match the surrounding finishes. Refer to specification section 09900 - Coordinate color with Architect.

END OF SECTION

SECTION 26 0537

BOXES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall and ceiling outlet boxes.

B. Pull and junction boxes.

1.02 REFERENCE STANDARDS

A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.

B. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association.

C. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports; National Electrical Manufacturers Association.

D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association.

E. NFPA 70 - National Electrical Code; National Fire Protection Association.

1.03 SUBMITTALS

A. Product Data: Provide dimensions, knockout sizes and locations, materials, fabrication details, finishes, and accessories.

B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Quality Assurance. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

C. Project Record Documents: Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Provide products listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

C. Pull boxes, junction boxes, and cable support boxes of proper size and design shall be provided in accordance with the N.E.C. and as required to facilitate installation of wires. All boxes shall be sized in accordance with the N.E.C. Covers shall be gasketed and held in place with corrosion resistant machine screws. Cable supports for vertical runs shall be provided at code required locations, within pull or junction boxes. Boxes shall be NEMA 12 for inside and NEMA 4 for outside use where exposed to the weather or where otherwise called for on the drawings.

PART 2 PRODUCTS

2.01 OUTLET BOXES

A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.

1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch (13 mm) male fixture studs where required.

B. Cast Boxes: NEMA FB 1, Type FD, cast feralloy. Provide gasketed cover by box

manufacturer. Provide threaded hubs.

C. Wall Plates for Finished Areas: As specified in Section 26 2726.

D. Outlet and switch boxes shall be minimum of 2-1/8" deep. When installed in a poured wall a 2-1/2" minimum deep box shall be used. When installed in masonry a 3-1/2" minimum deep box shall be used.

E. Use 2-gang 4" square boxes with single plaster rings for single device outlets.

2.02 FLOOR BOXES

A. Floor Boxes: NEMA OS 1, fully adjustable, 3.5 inches deep.

B. Material: Cast Iron.

C. Shape: Rectangular.

D. Service Fittings: As specified in Section 26 2726.

E. Conform to regulatory requirements for concrete-tight floor boxes.

2.03 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.

B. Surface Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface mounted junction box:

1. Material: Galvanized cast iron.
2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.

C. In-Ground Cast Metal Box: NEMA 250, Type 6, inside flanged, recessed cover box for flush mounting:

1. Material: Galvanized cast iron.
2. Cover: Smooth cover with neoprene gasket and stainless steel cover screws.
3. Cover Legend: "ELECTRIC".

D. Fiberglass Handholes: Die molded glass fiber hand holes:

1. Composite handholds shall be constructed of polymer concrete and reinforced by a heavy weave fiberglass. The handholes shall have internal dimensions not less than that indicated. The material shall have the following properties:
   a. Compressive strength: 11,000 PSI; Tensile strength: 1,700 PSI; Flexural strength: 7,500 PSI.
2. Cable Entrance: Pre-cut 6 x 6 inch (150 x 150 mm) cable entrance at center bottom of each side.
3. Cover: Glass fiber weatherproof cover with nonskid finish.
4. Manufacturer:
   a. Quazite.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify locations of floor boxes and outlets in offices and work areas prior to rough-in.

B. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Install at location required for box to serve intended purpose.

3.02 INSTALLATION

A. Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1.

B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and as required by NFPA 70.

C. Coordinate installation of outlet boxes for equipment connected under Section 26 2717.

D. Set wall mounted boxes at elevations to accommodate mounting heights indicated.

E. Electrical boxes are shown on Drawings in approximate locations unless dimensioned.

F. Orient boxes to accommodate wiring devices oriented as specified in Section 26 2726.

G. Maintain headroom and present neat mechanical appearance.

H. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

I. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches (150 mm) from ceiling access panel or from removable recessed luminaire.

J. Provide identification labels on all junction boxes indicating what systems/equipment circuits are feeding (i.e. Lights in Room #102) and where they are being fed from (i.e. Panel LP-1)

K. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.

L. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes.

M. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.

N. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

O. Use flush mounting outlet box in finished areas.

P. Do not install flush mounting box back-to-back in walls; provide minimum 6 inches (150 mm) separation. Provide minimum 24 inches (600 mm) separation in acoustic rated walls.

Q. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.

R. Use stamped steel bridges to fasten flush mounting outlet box between studs.

S. Install flush mounting box without damaging wall insulation or reducing its effectiveness.

T. Use adjustable steel channel fasteners for hung ceiling outlet box.

U. Do not fasten boxes to ceiling support wires.

V. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12 inches (305 mm) of box.

W. Use gang box where more than one device is mounted together. Do not use sectional box. Telephone/Data gang boxes shall be separate from power device gang boxes.

X. Use 2-gang 4" square boxes with single plaster rings for single device outlets.

Y. Use cast outlet box in exterior locations and wet locations.

Z. Large Pull Boxes (boxes larger than 100 cubic inches in volume or 12 inches in any dimension): Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

3.03 ADJUSTING

A. Adjust floor boxes flush with finish flooring material.

B. Adjust flush-mounting outlets to make front flush with finished wall material.

C. Install knockout closures in unused box openings.

3.04 CLEANING

A. Clean interior of boxes to remove dust, debris, and other material.

B. Clean exposed surfaces and restore finish.

END OF SECTION

SECTION 26 0553

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Nameplates and labels.

B. Wire and cable markers.

C. Conduit markers.

D. Underground waring tape.

E. Panel schedules.

1.02 REFERENCE STANDARDS

A. NFPA 70 - National Electrical Code; National Fire Protection Association.

1.03 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Brady Corporation: www.bradycorp.com.

B. Seton Identification Products: www.seton.com/aec.

C. Thomas & Betts.

D. Panduit.

2.02 NAMEPLATES AND LABELS

A. Nameplates: Engraved three-layer laminated plastic, black letters on white background.

B. Locations:

1. Each electrical distribution and control equipment enclosure (including starters, disconnects, panelboards, breakers at distribution panels, etc.).
2. Communication cabinets.

C. Letter Size:

1. Use 1/2 inch letters for identifying equipment and loads. Identification shall indicate where the load is fed from.

2.03 WIRE MARKERS

A. Description: Vinyl cloth type self-adhesive wire markers.

B. Description: tape or split sleeve type wire markers.

C. Locations: Each conductor at panelboard gutters, pull boxes, outlet boxes, and junction boxes each load connection.

D. Legend:

1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.
2. Control Circuits: Control wire number indicated on shop drawings.

2.04 CONDUIT MARKERS

A. Description: Size: 1-1/8"x4-1/2" minimum. Color: Background color as specified below with black lettering.

B. Location: Furnish markers for each conduit longer than 6 feet (2 m).

C. Spacing: 20 feet (6 m) on center.

D. Color:

1. Fire Alarm System: Red.

E. Legend:

1. 208 Volt System: 208 Volt.
2. Fire Alarm System: Fire Alarm.

2.05 UNDERGROUND WARNING TAPE

A. Description: 4 inch (100 mm) wide plastic tape, detectable type colored red with suitable warning legend describing buried electrical lines.

2.06 PANEL SCHEDULES

A. Each panel shall have a typewritten panel schedule indicating loads. A clear plastic cover over the schedule shall be provided to protect it.

B. Existing panel schedules shall be improved to indicate all existing loads and/or updated to indicate all changes that have occurred during renovation. Typing over writing over existing entries on existing schedules is not acceptable. A new schedule shall be provided. Entries must be in type written form.

PART 3 EXECUTION

3.01 PREPARATION

A. Degrease and clean surfaces to receive nameplates and labels.

3.02 INSTALLATION

A. Install nameplates and labels parallel to equipment lines.

B. Secure nameplates to equipment front using screws or rivets.

C. Secure nameplates to inside surface of door on panelboard that is recessed in finished locations.

D. Identify underground conduits using underground warning tape. Install one tape per trench at 3 inches (75 mm) below finished grade.

E. Identify all boxes for fire alarm circuits by painting cover plates red.

END OF SECTION

SECTION 26 0923

LIGHTING CONTROL DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Occupancy sensors.

1.02 REFERENCE STANDARDS

A. ANSI C136.10 - American National Standard for Roadway and Area Lighting Equipment - Locking-Type Photocontrol Devices and Mating Receptacles - Physical and Electrical Interchangeability and Testing; 2006.

B. ANSI C136.24 - American National Standard for Roadway and Area Lighting Equipment - Nonlocking (Button) Type Photocontrols.

C. NECA 1 - Standard for Good Workmanship in Electrical Contracting.

D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

E. NFPA 70 - National Electrical Code; National Fire Protection Association.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the placement of lighting control devices with millwork, furniture, equipment, etc. installed under other sections or by others.
2. Coordinate the placement of wall switch occupancy sensors with actual installed door swings.
3. Coordinate the placement of occupancy sensors with millwork, furniture, equipment or other potential obstructions to motion detection coverage installed under other sections or by others.
4. Notify ENGINEER of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

B. Sequencing:

1. Do not install lighting control devices until final surface finishes and painting are complete.

1.04 SUBMITTALS

A. Product Data: Include ratings, configurations, standard wiring diagrams, dimensions, colors, service condition requirements, and installed features.

1. Occupancy Sensors: Include detailed motion detection coverage range diagrams.

B. Shop Drawings:

1. Occupancy Sensors: Provide lighting plan indicating location, model number, and orientation of each occupancy sensor and associated system component.

C. Field Quality Control Reports.

D. Manufacturer's Installation Instructions: Include application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

E. Operation and Maintenance Data: Include detailed information on device programming and setup.

F. Project Record Documents: Record actual installed locations and settings for lighting control devices.

1.05 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 DELIVERY, STORAGE, AND PROTECTION

A. Store products in a clean, dry space in original manufacturer's packaging in accordance with manufacturer's written instructions until ready for installation.

1.07 FIELD CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.08 WARRANTY

A. Provide five year manufacturer warranty for all occupancy sensors.

PART 2 PRODUCTS

2.01 ALL LIGHTING CONTROL DEVICES

A. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

B. Unless specifically indicated to be excluded, provide all required conduit, wiring, connectors, hardware, components, accessories, etc. as required for a complete operating system.

C. Products for Switching of Electronic Fluorescent Ballasts: Tested and rated to be suitable for peak inrush currents specified in NEMA 410.

2.02 OCCUPANCY SENSORS

A. Manufacturers:

1. Hubbell Building Automation, Inc.: www.hubbellautomation.com
2. Sensor Switch Inc.: www.sensorswitch.com.
3. WattStopper: www.wattstopper.com.
4. Leviton.
5. Cooper.
6. Source Limitations: Furnish products produced by a single manufacturer and obtained from a single supplier.

B. All Occupancy Sensors:

1. Description: Factory-assembled commercial specification grade devices for indoor use capable of sensing both major motion, such as walking, and minor motion, such as small desktop level movements, according to published coverage areas, for automatic control of load indicated.
2. Sensor Technology:
   a. Passive Infrared (PIR) Occupancy Sensors: Designed to detect occupancy by sensing movement of thermal energy between zones.

b. Ultrasonic Occupancy Sensors: Designed to detect occupancy by sensing frequency shifts in emitted and reflected inaudible sound waves.

c. Passive Infrared/Ultrasonic Dual Technology Occupancy Sensors: Designed to detect occupancy using a combination of both passive infrared and ultrasonic technologies.

d. Passive Infrared/Acoustic Dual Technology Occupancy Sensors: Designed to detect occupancy using a combination of both passive infrared and audible sound sensing technologies.

3. Provide LED to visually indicate motion detection with separate color LEDs for each sensor type in dual technology units.

4. Operation: Unless otherwise indicated, occupancy sensor to turn load on when occupant presence is detected and to turn load off when no occupant presence is detected during an adjustable turn-off delay time interval.

5. Dual Technology Occupancy Sensors: Field configurable turn-on and hold-on activation with settings for activation by either or both sensing technologies.

6. Passive Infrared Lens Field of View: Field customizable by addition of factory masking material, adjustment of integral blinders, or similar means to block motion detection in selected areas.

7. Turn-Off Delay: Field adjustable, up to a maximum time delay setting of not less than 15 minutes and not more than 30 minutes.

8. Sensitivity: Field adjustable.

9. Adaptive Technology: Field selectable; capable of self-adjusting sensitivity and time delay according to conditions.

10. Integral Photocell: For field selectable and adjustable inhibition of automatic turn-on of load when ambient lighting is above the selected level.

11. Compatibility: Suitable for controlling incandescent lighting, low-voltage lighting with electronic and magnetic transformers, fluorescent lighting with electronic and magnetic ballasts, and fractional motor loads, with no minimum load requirements.

12. Load Rating for Line Voltage Occupancy Sensors: As required to control the load indicated on the drawings.

13. Isolated Relay for Low Voltage Occupancy Sensors: SPDT dry contacts, ratings as required for interface with system indicated.

C. Wall Switch Occupancy Sensors:

1. All Wall Switch Occupancy Sensors:

a. Description: Occupancy sensors designed for installation in standard wall box at standard wall switch mounting height with a field of view of 180 degrees, integrated manual control capability, and no leakage current to load in off mode.

b. Unless otherwise indicated or required to control the load indicated on the drawings, provide line voltage units with self-contained relay.

c. Where indicated, provide two-circuit units for control of two separate lighting loads, with separate manual controls and separately programmable operation for each load.

d. Occupancy sensor to be field selectable as either manual-on/automatic-off or automatic on/off.

e. Manual-Off Override Control: When used to turn off load while in automatic-on mode, unit to revert back to automatic mode after no occupant presence is detected during the delayed-off time interval.

f. Provide selectable audible alert to notify occupant of impending load turn-off.

g. Finish: Match finishes specified for wiring devices in Section 26 2726, unless otherwise indicated.

h. Provide vandal resistant lenses for passive infrared (PIR) and dual technology wall switch occupancy sensors where indicated.

2. Passive Infrared (PIR) Wall Switch Occupancy Sensors: Capable of detecting motion within an area of 900 square feet (83.6 sq. m).

3. Ultrasonic Wall Switch Occupancy Sensors: Capable of detecting motion within an area of 400 square feet (37.2 sq. m).

4. Passive Infrared/Ultrasonic Dual Technology Wall Switch Occupancy Sensors: Capable of detecting motion within an area of 900 square feet (83.6 sq. m).

D. Ceiling Mounted Occupancy Sensors:

1. All Ceiling Mounted Occupancy Sensors:

a. Description: Low profile occupancy sensors designed for ceiling installation.

b. Unless otherwise indicated or required to control the load indicated on the drawings, provide low voltage units, for use with separate compatible accessory power packs.

c. Provide field selectable setting for disabling LED motion detector visual indicator.

d. Occupancy sensor to be field selectable as either manual-on/automatic-off or automatic on/off.

e. Finish: White unless otherwise indicated.

2. Passive Infrared (PIR) Ceiling Mounted Occupancy Sensors:

a. Standard Range Sensors: Capable of detecting motion within an area of 450 square feet (41.8 square meters) at a mounting height of 9 feet (2.7 m), with a field of view of 360 degrees.

b. Extended Range Sensors: Capable of detecting motion within an area of 1,200 square feet (111.5 sq. m) at a mounting height of 9 feet (2.7 m), with a field of view of 360 degrees.

3. Ultrasonic Ceiling Mounted Occupancy Sensors:

a. Standard Range Sensors: Capable of detecting motion within an area of 500 square feet (46.5 sq. m) at a mounting height of 9 feet (2.7 m), with a field of view of 360 degrees.

b. Medium Range Sensors: Capable of detecting motion within an area of 1,000 square feet (92.9 sq. m) at a mounting height of 9 feet (2.7 m), with a field of view of 360 degrees.

c. Extended Range Sensors: Capable of detecting motion within an area of 2,000 square feet (185.8 sq. m) at a mounting height of 9 feet (2.7 m).

4. Passive Infrared/Ultrasonic Dual Technology Ceiling Mounted Occupancy Sensors:

a. Standard Range Sensors: Capable of detecting motion within an area of 450 square feet (41.8 sq. m) at a mounting height of 9 feet (2.7 m), with a field of view of 360 degrees.

b. Extended Range Sensors: Capable of detecting motion within an area of 1,200 square feet (111.5 sq. m) at a mounting height of 9 feet (2.7 m), with a field of view of 360 degrees.

5. Passive Infrared/Acoustic Dual Technology Ceiling Mounted Occupancy Sensors:
   a. Standard Range Sensors: Capable of detecting motion within an area of 450 square feet (41.8 sq. m) at a mounting height of 9 feet (2.7 m), with a field of view of 360 degrees.
   b. Extended Range Sensors: Capable of detecting motion within an area of 1,200 square feet (111.5 sq. m) at a mounting height of 9 feet (2.7 m).

E. Directional Occupancy Sensors:
1. All Directional Occupancy Sensors: Designed for wall or ceiling mounting, with integral swivel for field adjustment of motion detection coverage.
   a. Unless otherwise indicated or required to control the load indicated on the drawings, provide low voltage units, for use with separate compatible accessory power packs.
   b. Provide field selectable setting for disabling LED motion detector visual indicator.
   c. Finish: White unless otherwise indicated.
2. Passive Infrared (PIR) Directional Occupancy Sensors:
   a. Standard Range Sensors: Capable of detecting motion within a distance of 40 feet (12 m) at a mounting height of 10 feet (3.1 m).
   b. Long Range Sensors: Capable of detecting motion within a distance of 80 feet (24 m) at a mounting height of 10 feet (3.1 m).
   c. High Bay Sensors: Capable of detecting motion within a distance of 50 feet (15 m) at a mounting height of 30 feet (9.1 m).
3. Passive Infrared/Ultrasonic Dual Technology Directional Occupancy Sensors: Capable of detecting motion within a distance of 40 feet (12 m) at a mounting height of 10 feet (3.1 m).

F. Power Packs for Low Voltage Occupancy Sensors:
1. Description: Plenum rated, self-contained low voltage class 2 transformer and relay compatible with specified low voltage occupancy sensors for switching of line voltage loads.
2. Provide quantity and configuration of power and slave packs with all associated wiring and accessories as required to control the load indicated on the drawings.
3. Input Supply Voltage: Dual rated for 120/277 V ac.
4. Load Rating: As required to control the load indicated on the drawings.

G. Accessories:
1. Provide heavy duty coated steel wire protective guards compatible with specified occupancy sensors where indicated.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

C. Verify that openings for outlet boxes are neatly cut and will be completely covered by devices or wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to

lighting control devices.

F. Verify that the service voltage and ratings of lighting control devices are appropriate for the service voltage and load requirements at the location to be installed.

G. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

A. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated

B. Coordinate locations of outlet boxes provided under Section 26 0537 as required for installation of lighting control devices provided under this section.

1. Mounting Heights: Unless otherwise indicated, as follows:

a. Wall Switch Occupancy Sensors: 48 inches (1.2 m) above finished floor.

2. Orient outlet boxes for vertical installation of lighting control devices unless otherwise indicated.

3. Locate wall switch occupancy sensors on strike side of door with edge of wall plate 3 inches (80 mm) from edge of door frame. Where locations are indicated otherwise, notify ENGINEER to obtain direction prior to proceeding with work.

C. Install lighting control devices in accordance with manufacturer's instructions.

D. Unless otherwise indicated, connect lighting control device grounding terminal or conductor to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

E. Install lighting control devices plumb and level, and held securely in place.

F. Where required and not furnished with lighting control device, provide wall plate in accordance with Section 26 2726.

G. Where applicable, install lighting control devices and associated wall plates to fit completely flush to mounting surface with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

H. Install identification label for wall switch occupancy sensors, in-wall time switches, in-wall interval timers, and accessory manual wall switches in accordance with Section 26 0526 indicating load served where indicated, when controlling loads that are not visible from the control location, or when multiple control devices are installed at one location.

I. Occupancy Sensor Locations:

1. Location Adjustments: Locations indicated are diagrammatic and only intended to indicate which rooms or areas require devices. Provide quantity and locations as required for complete coverage of respective room or area based on manufacturer's recommendations for installed devices.

2. Locate ultrasonic and dual technology passive infrared/ultrasonic occupancy sensors a minimum of 4 feet (1.2 m) from air supply ducts or other sources of heavy air flow and as per manufacturer's recommendations, in order to minimize false triggers.

J. Unless otherwise indicated, install power packs for lighting control devices above accessible ceiling or above access panel in inaccessible ceiling near the sensor location.

K. Where indicated, install separate compatible wall switches for manual control interface with lighting control devices or associated power packs.

L. Unless otherwise indicated, install switches on load side of power packs so that switch does not turn off power pack.

3.04 FIELD QUALITY CONTROL

A. Inspect each lighting control device for damage and defects.

B. Test occupancy sensors to verify proper operation, including time delays and ambient light thresholds where applicable. Verify optimal coverage for entire room or area. Record test results in written report to be included with submittals.

C. Correct wiring deficiencies and replace damaged or defective lighting control devices.

3.05 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

B. Adjust occupancy sensor settings to minimize undesired activations while optimizing energy savings, and to achieve desired function as indicated or as directed by ENGINEER.

C. Adjust position of directional occupancy sensors and outdoor motion sensors to achieve optimal coverage as required.

D. Where indicated or as directed by Architect, install factory masking material or adjust integral blinders on passive infrared (PIR) and dual technology occupancy sensor lenses to block undesired motion detection.

3.06 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.07 CLOSEOUT ACTIVITIES

A. Refer to Division 1.

B. Demonstration: Demonstrate proper operation of lighting control devices to ENGINEER, and correct deficiencies or make adjustments as directed.

C. Training: Train OWNER's personnel on operation, adjustment, programming, and maintenance of lighting control devices.

1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.

2. Provide minimum of two hours of training.

3. Instructor: Qualified contractor familiar with the project and with sufficient knowledge of the installed lighting control devices.

4. Location: At project site.

END OF SECTION

SECTION 26 2416

PANELBOARDS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Power distribution panelboards.

B. Lighting and appliance panelboards.

C. Overcurrent protective devices for panelboards.

1.02 REFERENCE STANDARDS

A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; Federal Specification; Revision D.

B. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.

C. NECA 407 - Standard for Installing and Maintaining Panelboards; National Electrical Contractors Association.

D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

E. NEMA PB 1 - Panelboards; National Electrical Manufacturers Association.

F. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less; National Electrical Manufacturers Association.

G. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association.

H. NFPA 70 - National Electrical Code; National Fire Protection Association.

I. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.

J. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.

K. UL 67 - Panelboards; Current Edition, Including All Revisions.

L. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.

B. Project Record Documents: Record actual installed locations of panelboards and actual installed circuiting arrangements.

C. Maintenance Data: Include information on replacement parts and recommended maintenance procedures and intervals.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years documented experience.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
   a. Field verify existing conditions as required to verify that new equipment can be installed within the existing conditions prior to ordering new equipment.
3. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted panelboards where indicated.
4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
5. Notify ENGINEER of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.

B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.

C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

1.07 MAINTENANCE MATERIALS

A. Furnish two of each panelboard key.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. General Electric Company: www.geindustrial.com.

B. Schneider Electric; Square D Products: www.schneider-electric.us.

1. BASE BID Square D, other approved manufacturers may only be bid as a voluntary alternate to the base bid and must be clarified in the bid as such.

C. Siemens.

2.02 ALL PANELBOARDS

A. Provide products listed and labeled by Underwriters Laboratories Inc. as suitable for the purpose indicated.

B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:

1. Altitude: Less than 6,600 feet (2,000 m).
2. Ambient Temperature:
   a. Panelboards Containing Circuit Breakers: Between 23 degrees F (-5 degrees C) and 104 degrees F (40 degrees C).

C. Short Circuit Current Rating: Refer to plans – Contractor shall verify AIC with local utility prior to

ordering panelboards.

D. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.

E. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.

F. Bussing: Sized in accordance with UL 67 temperature rise requirements.

1. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.

G. Conductor Terminations: Suitable for use with the conductors to be installed.

H. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.

1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:

2. Boxes: Galvanized steel unless otherwise indicated.

a. Provide wiring gutters sized to accommodate the conductors to be installed.

3. Fronts:

a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.

b. Fronts for Flush-Mounted Enclosures: Overlap boxes on all sides to conceal rough opening.

4. Lockable Doors: All locks keyed alike unless otherwise indicated.

I. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

2.03 POWER DISTRIBUTION PANELBOARDS

A. Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

B. Conductor Terminations:

1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

2. Main and Neutral Lug Type: Mechanical.

C. Bussing:

1. Phase and Neutral Bus Material: Aluminum.

2. Ground Bus Material: Aluminum.

D. Circuit Breakers:

1. Provide bolt-on type or plug-in type secured with locking mechanical restraints.

E. Enclosures:

1. Provide surface-mounted enclosures unless otherwise indicated.

F. Manufacturers:

1. Square D I-Line. BASE BID SQUARE D.

2. Equal by approved manufacturer may be bid as alternate.

G. Description: NEMA PB 1, circuit breaker type.

J. Minimum integrated short circuit rating: As indicated. 22,000 amps rms minimum. Contractor

shall verify AIC with local utility prior to ordering panelboards.

H. Molded Case Circuit Breakers: With integral thermal and instantaneous magnetic trip in each pole; UL listed. For air conditioning equipment branch circuits provide circuit breakers UL listed as Type HACR.

I. Enclosure: NEMA PB 1, Type 1, 16 inches deep, 40 inches wide, cabinet box, minimum.

J. Cabinet Front: Surface type, fastened with concealed trim clamps, hinged door with flush lock, finished in manufacturer's standard gray enamel.

2.04 LIGHTING AND APPLIANCE PANELBOARDS

A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.

B. Conductor Terminations:

1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

2. Main and Neutral Lug Type: Mechanical.

C. Bussing:

1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.

2. Phase and Neutral Bus Material: Aluminum.

a. Provide double neutral bus where scheduled.

3. Ground Bus Material: Aluminum.

a. Provide insulated ground bus where scheduled.

D. Circuit Breakers: Thermal magnetic bolt-on type unless otherwise indicated.

E. Enclosures:

1. Provide surface-mounted or flush-mounted enclosures as indicated.

2. Provide clear plastic circuit directory holder mounted on inside of door.

F. Manufacturers:

1. Square D NQ or NF type. BASE BID SQUARE D.

2. Equal by approved manufacturer may be bid as alternate.

G. Description: NEMA PB1, circuit breaker type, lighting and appliance branch circuit panelboard.

H. Minimum Integrated Short Circuit Rating: As indicated on drawings or minimum as listed below.

1. 208/240 Volt Panelboards: 14,000 amperes rms symmetrical.

I. Molded Case Circuit Breakers: Thermal magnetic trip circuit breakers, bolt-on type, with common trip handle for all poles; UL listed.

1. Type SWD for lighting circuits.

2. Type HACR for air conditioning equipment circuits.

3. Class A ground fault interrupter circuit breakers where scheduled.

4. Do not use tandem circuit breakers.

5. Lock-on devices shall be provided for all branch circuits supplying exit lighting, un-switched

night lighting, emergency lighting, security systems, clock and program systems, and/or fire alarm.

J. Enclosure: NEMA PB 1, Type 1. (Type 3R for exterior locations).

K. Cabinet Front: Flush or Surface (as noted on plans) cabinet front with concealed trim clamps, concealed hinge, metal directory frame, and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.

2.05 OVERCURRENT PROTECTIVE DEVICES

A. Molded Case Circuit Breakers:

1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.

2. Interrupting Capacity:

a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:

b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.

3. Conductor Terminations:

a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.

4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.

5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install products in accordance with manufacturer's instructions.

B. Install panelboards securely, in a neat and workmanlike manner in accordance with NECA 1 (general workmanship), NECA 407 (panelboards), and NEMA PB 1.1.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide required supports in accordance with Section 26 0529.

E. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.

F. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches (2000 mm) above the floor or working platform.

G. Provide grounding and bonding in accordance with Section 26 0526.

H. Install all field-installed branch devices, components, and accessories.

I. Install panelboards in accordance with NEMA PB 1.1 and NECA 1.

J. Install panelboards plumb. Install recessed panelboards flush with wall finishes.

K. Height: 6 feet (1800 mm) to top of panelboard; install panelboards taller than 6 feet (1800 mm) with bottom no more than 4 inches (100 mm) above floor.

L. Provide filler plates to cover unused spaces in panelboards.

M. Provide computer-generated circuit directory for each lighting and appliance panelboard, and each power distribution panelboard provided with a door, clearly and specifically indicating the loads served. Identify spares and spaces.

N. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.

O. Provide identification nameplate for each panelboard in accordance with Section 26 0553.

P. Provide arc flash warning labels in accordance with NFPA 70.

Q. Provide spare conduits out of each recessed panelboard to an accessible location above ceiling. Identify each as SPARE.

1. Minimum spare conduits: 5 empty 1 inch (DN27). Spare conduits shall be stubbed up into an accessible ceiling space.

R. Ground and bond panelboard enclosure according to current electrical codes.

3.02 FIELD QUALITY CONTROL

A. Perform inspection, testing, and adjusting in accordance with Section 01 4000.

B. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA STD ATS, Section 7.6.1.1 for all main circuit breakers and circuit breakers larger than 400 amperes. Tests listed as optional are not required.

C. Correct deficiencies and replace damaged or defective panelboards or associated components.

D. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers, fusible switches, and fuses.

3.03 ADJUSTING

A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.

B. Adjust alignment of panelboard fronts.

END OF SECTION

SECTION 26 2717

EQUIPMENT WIRING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Electrical connections to equipment.

1.02 REFERENCE STANDARDS

A. NEMA WD 1 - General Color Requirements for Wiring Devices; National Electrical Manufacturers Association.

B. NEMA WD 6 - Wiring Devices - Dimensional Requirements; National Electrical Manufacturers Association.

C. NFPA 70 - National Electrical Code; National Fire Protection Association.

1.03 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.04 COORDINATION

A. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.

B. Determine connection locations and requirements.

C. Sequence rough-in of electrical connections to coordinate with installation of equipment.

D. Sequence electrical connections to coordinate with start-up of equipment.

PART 2 PRODUCTS

2.01 MATERIALS

A. Cords and Caps: NEMA WD 6; match receptacle configuration at outlet provided for equipment.

1. Colors: Conform to NEMA WD 1.
2. Cord Construction: NFPA 70, Type SO, multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
3. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

B. Disconnect Switches: As specified in Section 26 2818, 26 2913 and in individual equipment sections.

C. Wiring Devices: As specified in Section 26 2726.

D. Flexible Conduit: As specified in Section 26 0534.

E. Wire and Cable: As specified in Section 26 0519.

F. Boxes: As specified in Section 26 0537.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that equipment is ready for electrical connection, wiring, and energization.

3.02 ELECTRICAL CONNECTIONS

A. Make electrical connections in accordance with equipment manufacturer's instructions.

B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations. Maximum length shall be 6 feet. Minimum size shall be 3/4" diameter.

C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.

D. Provide receptacle outlet to accommodate connection with attachment plug.

E. Provide cord and cap where field-supplied attachment plug is required.

F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.

G. Install disconnect switches, controllers, control stations, and control devices to complete equipment wiring requirements.

H. Install terminal block jumpers to complete equipment wiring requirements.

I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.

END OF SECTION

SECTION 26 2726

WIRING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wall switches.

B. Wall dimmers.

C. Receptacles.

D. Wall plates.

1.02 REFERENCE STANDARDS

A. FS W-C-596 - Connector, Electrical, Power, General Specification for; Federal Specification; Revision G.

B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush-mounted (General Specification); Federal Specification; Revision F.

C. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.

D. NEMA WD 1 - General Color Requirements for Wiring Devices; National Electrical Manufacturers Association.

E. NEMA WD 6 - Wiring Device -- Dimensional Requirements; National Electrical Manufacturers Association.

F. NFPA 70 - National Electrical Code; National Fire Protection Association.

G. UL 20 - General-Use Snap Switches; Current Edition, Including All Revisions.

H. UL 498 - Attachment Plugs and Receptacles; Current Edition, Including All Revisions.

I. UL 514D - Cover Plates for Flush-Mounted Wiring Devices; Current Edition, Including All Revisions.

J. UL 1472 - Solid-State Dimming Controls; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.

B. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years documented experience.

1.05 EXTRA MATERIALS

A. Furnish two of each style/size of wiring device and finish wall plate.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Cooper Wiring Devices: www.cooperwiringdevices.com.

B. Leviton Manufacturing, Inc.: www.leviton.com.

C. Hubbell.

D. Bryant.

2.02 ALL WIRING DEVICES

A. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

2.03 WALL SWITCHES

A. All Wall Switches: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.

1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.

B. Wall Switches: NEMA WD 1, General Duty, Spec. Grade, AC only general-use snap switch. Switches shall be binding screw type, side and back wired type.

1. Body and Handle: Ivory plastic with toggle handle. Coordinate color selection with Architect prior to ordering.

2. Ratings: Match branch circuit and load characteristics.

C. Single Pole Single Throw Wall Switches

1. Products:

a. Hubbell 1221.

b. Arrow Hart 1991.

c. Leviton 1221.

D. Three Way Wall Switches

1. Products:

a. Hubbell 1223.

b. Arrow Hart 1993.

c. Leviton 1223.

E. Four Way Wall Switches

1. Products:

a. Hubbell 1224.

b. Arrow Hart 1994.

c. Leviton 1224.

2.04 WALL DIMMERS

A. All Wall Dimmers: Solid-state with continuous full-range even control following square law dimming curve, integral radio frequency interference filtering, power failure preset memory, air gap switch accessible without removing wall plate, complying with NEMA WD 1 and NEMA WD

6, and listed as complying with UL 1472; types and ratings suitable for load controlled as indicated on the drawings.

B. Wall Dimmers: Semiconductor dimmer for incandescent lamps, Type I, complying with NEMA WD 6 and WD 1. Preset slide controls - Single pole and 3-way with LED locator.

C. Manufacturers:

1. Hubbell.
2. Lutron.
3. Leviton "IllumaTech Series".

D. Body and Handle: Ivory plastic with preset linear slide. Coordinate color selection with Architect prior to ordering.

E. Voltage: Match lighting circuit voltage volts.

F. Power Rating: Match load shown on drawings; 600 watts minimum.

G. Note: For LED type light fixtures, Contractor shall provide dimmer type compatible with LED type fixtures being controlled by the dimmer.

H. Provide accessory wall switches to match dimmer appearance when installed adjacent to each other.

2.05 RECEPTACLES

A. All Receptacles: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.

1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
2. NEMA configurations specified are according to NEMA WD 6.

B. Receptacles: NEMA WD 1, General duty, Spec. Grade, grounded type

1. Configuration: NEMA WD 6, type as specified and indicated.

C. 20 Amp Duplex Convenience Receptacles.

1. Hubbell 5362.
2. Arrow Hart 5362.
3. Leviton 5362.
4. Device Body: Ivory; Coordinate color selection with Architect prior to ordering. All devices on emergency circuits shall be red in color.

D. 20 Amp GFCI Receptacles: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.

1. Hubbell.
2. Arrow Hart.
3. Leviton.
4. Device Body: Ivory. Coordinate color selection with Architect prior to ordering. All devices on emergency circuits shall be red in color.
5. GFCI receptacles shall meet UL 2003 standards.

E. 30 Amp, 120/240V (NEMA 10-30R) Receptacles.

1. Hubbell 9350 series or equal by Arrow Hart or Leviton.

2.06 WALL PLATES

A. All Wall Plates: Comply with UL 514D.

1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.

2. Screws: Metal with slotted heads finished to match wall plate finish.

B. Weatherproof Cover Plates (where located outdoors and where indicated on plans as "WP"): Raintight/gasketed, clear impact resistant thermoplastic, spring retained cover with offset device opening for cord exit.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as shown on the drawings.

B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.

C. Verify that wall openings are neatly cut and will be completely covered by wall plates.

D. Verify that final surface finishes are complete, including painting.

E. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

F. Verify door openings/swings with Architectural trades prior to installation.

3.02 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.

B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION

A. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.

B. Coordinate locations of outlet boxes provided under Section 26 0537 as required for installation of wiring devices provided under this section.

C. Install wiring devices in accordance with manufacturer's instructions.

D. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.

E. Where required, connect wiring devices using pigtails not less than 6 inches (150 mm) long. Do not connect more than one conductor to wiring device terminals.

F. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.

G. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

H. Install wiring devices plumb and level with mounting yoke held rigidly in place.

I. Install wall switches with OFF position down.

J. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.

K. Do not share neutral conductor on branch circuits utilizing wall dimmers.

L. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.

M. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

N. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

O. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.

P. Use jumbo size plates for outlets installed in masonry walls.

Q. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

R. Install protective rings on active flush cover service fittings.

3.04 INTERFACE WITH OTHER PRODUCTS

A. Coordinate locations of outlet boxes provided under Section 26 0537 to obtain mounting heights indicated on drawings.

B. Install wall switches, dimmers, motor control switches, and fire alarm pull stations at 50 inches to center of box above finished floor. For CMU walls - 48" to top of box above finished floor.

C. Install convenience receptacles 18 inches (450 mm) above finished floor to center of box (not otherwise specified).

D. Install convenience and special purpose receptacle outlets in CLASS 1 locations at 24" above the floor to bottom of box.

E. Install convenience receptacles in CMU walls at 16 inches above floor to bottom of box.

F. Unless noted otherwise, install GFI receptacles in toilet rooms, janitor closets, and storage rooms 48 inches to top of the box above floor.

G. Install convenience receptacles 6 inches (150 mm) above counter. Or as required to accommodate the counter construction - refer to Architectural elevations.

H. Install telephone jacks, data outlets, communication outlets, etc. 18 inches (450 mm) to center of box above finished floor. For CMU walls - 16" to bottom of box above finished floor.

I. Install fire alarm horns, strobes, speakers at 96 inches above floor (to top of box) or 6 inches below ceiling, whichever is less. But no lower than 80" above finish floor.

J. Coordinate installation of access floor boxes with access floor system provided under Section 09 6900.

K. Coordinate the installation of wiring devices with underfloor duct service fittings provided under Section 26 0540.

L. Coordinate all finishes and colors of wiring devices with Architect prior to ordering.

M. Coordinate mounting height/locations with Architect prior to rough-in.

3.05 FIELD QUALITY CONTROL

A. Inspect each wiring device for damage and defects.

B. Operate each wall switch, wall dimmer, and fan speed controller with circuit energized to verify proper operation.

C. Test each receptacle to verify operation and proper polarity.

D. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.

E. Correct wiring deficiencies and replace damaged or defective wiring devices.

3.06 ADJUSTING

A. Adjust devices and wall plates to be flush and level.

3.07 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION

SECTION 26 2813

FUSES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fuses.

1.02 REFERENCE STANDARDS

A. NEMA FU 1 - Low Voltage Cartridge Fuses; National Electrical Manufacturers Association.

B. NFPA 70 - National Electrical Code; National Fire Protection Association.

C. UL 248-1 - Low-Voltage Fuses - Part 1: General Requirements; Current Edition, Including All Revisions.

1.03 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.04 MAINTENANCE MATERIALS

A. Furnish three of each size and type fuse installed.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Cooper Bussmann, Inc.: www.cooperbussmann.com.

B. GE Industrial: www.geindustrial.com.

C. Mersen (formerly Ferraz Shawmut): ferrazshawmut.mersen.com.

D. Littelfuse, Inc.: www.littelfuse.com.

2.02 FUSES

A. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose indicated.

B. Unless specifically indicated to be excluded, provide fuses for all fusible equipment as required for a complete operating system.

C. Provide fuses of the same type, rating, and manufacturer within the same switch.

D. Comply with UL 248-1.

E. Unless otherwise indicated, provide cartridge type fuses complying with NEMA FU 1, Class and ratings as indicated.

F. Voltage Rating: Suitable for circuit voltage.

G. Main Service Switches Larger than 600 amperes: Class L (time delay).

H. Main Service Switches: Class RK1 (time delay).

I. Power Load Feeder Switches Larger than 600 amperes: Class L (time delay).

J. Power Load Feeder Switches: Class RK1 (time delay).

K. Motor Load Feeder Switches: Class RK1 (time delay).

L. Other Feeder Switches Larger than 600 amperes: L time delay.

M. Other Feeder Switches: Class RK1 (time delay).

N. General Purpose Branch Circuits: Class RK1 (time delay).

O. Motor Branch Circuits: Class L time delay.

PART 3 EXECUTION

3.01 INSTALLATION

A. Do not install fuses until circuits are ready to be energized.

B. Install fuses with label oriented such that manufacturer, type, and size are easily read.

END OF SECTION

SECTION 26 2818

ENCLOSED SWITCHES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fusible switches.

B. Nonfusible switches.

1.02 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.

B. NEMA FU 1 - Low Voltage Cartridge Fuses; National Electrical Manufacturers Association.

C. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum); National Electrical Manufacturers Association.

D. NFPA 70 - National Electrical Code; National Fire Protection Association.

1.03 SUBMITTALS

A. Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.

B. Project Record Documents: Record actual locations of enclosed switches.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. General Electric Company: www.geindustrial.com.

B. Schneider Electric; Square D Products: www.schneider-electric.us.

C. Siemens.

2.02 COMPONENTS

A. Fusible Switch Assemblies: 30 thru 600A, NEMA KS 1, Type HD quick-make, quick-break, enclosed load interrupter knife switch.

1. Externally operable handle interlocked to prevent opening front cover with switch in ON position.
2. Handle lockable in OFF position.
3. Fuse clips: Designed to accommodate NEMA FU1, Class R fuses.

B. Nonfusible Switch Assemblies: NEMA KS 1, Type HD quick-make, quick-break, enclosed load interrupter knife switch.

1. Externally operable handle interlocked to prevent opening front cover with switch in ON position.
2. Handle lockable in OFF position.

C. Enclosures: NEMA KS 1.

1. Interior Dry Locations: Type 1.
2. Exterior Locations: Type 3R or 4x.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install enclosed switches in accordance with manufacturer's instructions.

B. Install enclosed switches securely, in a neat and workmanlike manner in accordance with NECA 1.

C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.

D. Provide required supports in accordance with Section 26 0529.

E. Install enclosed switches plumb.

F. Except where indicated to be mounted adjacent to the equipment they supply, mount enclosed switches such that the highest position of the operating handle does not exceed 79 inches (2000 mm) above the floor or working platform.

G. Provide grounding and bonding in accordance with Section 26 0526.

H. Provide identification nameplate for each enclosed switch in accordance with Section 26 0553.

I. Provide arc flash warning labels in accordance with NFPA 70.

J. Install fuses in fusible disconnect switches.

K. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.

END OF SECTION

SECTION 26 3213.01

PACKAGED ENGINE GENERATOR SET

PART 1 GENERAL

1.01 SCOPE

A. Provide complete factory assembled generator set equipment package that meets performance requirements with programmable digital (microprocessor-based) electronic controls.

B. Provide factory test, startup by manufacturer's authorized distributor technician, and on-site system testing.

C. The generator set manufacturer shall warrant all equipment provided under this section, whether or not is manufactured by the generator set manufacturer, so that there is one source for warranty, parts and product service. Technicians specifically trained and certified by the manufacturer to support the product and employed by the generator set distributor shall service the generator sets.

D. This shall include, but not be limited to:

1. Package engine generator set.
2. Battery and charger.
3. Weatherproof enclosure.

1.02 REFERENCES, CODES AND STANDARDS

A. NECA/EGSA 404 - Recommended Practice for Installing Generator Sets; National Electrical Contractors Association.

B. The generator set installation and on-site testing shall conform to the requirements of the following codes and standards, as applicable. The generator set shall include necessary features to meet the requirements of these standards.

1. IEEE446 – Recommended Practice for Emergency and Standby Power Systems
2. NFPA37
3. NFPA70 – National Electrical Code. Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702.
4. NFPA110 – Emergency and Standby Power Systems. The generator set shall meet all requirements for Level 1 systems. Level 1prototype tests required by this standard shall have been performed on a complete and functional unit, component level type tests will not substitute for this requirement.

C. The generator set and supplied accessories shall meet the requirements of the following standards:

1. NEMA MG1-1998 part 32. Alternator shall comply with the requirements of this standard.
2. UL142 and State of Michigan DEQ – Sub-base Tanks
3. UL1236 – Battery Chargers
4. UL2200. The generator set shall be listed to UL2200 or submit to an independent third party certification process to verify compliance as installed..

D. The control system for the generator set shall comply with the following requirements.

1. EN50082-2, Electromagnetic Compatibility – Generic Immunity Requirements, Part 2: Industrial.

2. EN55011, Limits and Methods of Measurement of Radio Interference Characteristics of Industrial, Scientific and Medical Equipment.
3. FCC Part 15, Subpart B.
4. UL508. The entire control system of the generator set shall be UL508 listed and labeled.

E. The generator set manufacturer shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying quality assurance in design/development, production, installation, and service, in accordance with ISO 9001.

1.03 SUBMITTALS

A. Shop Drawings: Indicate electrical characteristics and connection requirements. Show plan and elevation views with overall and interconnection point dimensions, fuel consumption rate curves at various loads, ventilation and combustion air requirements, electrical diagrams including schematic and interconnection diagrams.

B. Product Data: Provide data showing dimensions, weights, ratings, interconnection points, and internal wiring diagrams for engine, generator, control panel, battery, battery rack, battery charger, exhaust silencer, vibration isolators, day tank, and remote radiator.

C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Manufacturer's Field Reports: Indicate procedures and findings.

F. Operation Data: Include instructions for normal operation.

G. Maintenance Data: Include instructions for routine maintenance requirements, service manuals for engine and day tank, oil sampling and analysis for engine wear, and emergency maintenance procedures.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70, NFPA 110, and NFPA 101.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years documented experience with service facilities within 100 miles of Project.

C. Supplier Qualifications: Authorized distributor of specified manufacturer with minimum three years documented experience.

D. Products: Furnish products listed and classified by Underwriters Laboratories as suitable for purpose specified and indicated.

1.05 WARRANTY

A. The generator set and associated equipment, including the ATS, shall be warranted for a period of not less than 5 years from the date of commissioning against defects in materials and workmanship.

B. The warranty shall be comprehensive. No deductibles shall be allowed for travel time, service hours, repair parts cost, etc.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept unit on site on skids. Inspect for damage.

B. Protect equipment from dirt and moisture by securely wrapping in heavy plastic.

1.07 MAINTENANCE SERVICE

A. Furnish service and maintenance of engine generator for one year from Date of Substantial Completion.

1.08 MAINTENANCE MATERIALS

A. Furnish one set of tools required for preventative maintenance of the engine generator system. Package tools in adequately sized metal tool box.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Caterpillar Inc.: www.caterpillar.com. (Not Olympian)

B. Cummins Engine Company: www.cummins.com.

C. Kohler.

D. Only approved bidders shall supply equipment provided under this contract. Equipment specifications for this project are based on generator sets manufactured by Cummins Power Generation with microprocessor-based controls. Equipment by other suppliers that meets the requirement of this specification are acceptable, if approved not less than 1 week before scheduled bid date. Proposals must include a line by line compliance statement based on this specification.

2.02 GENERATOR SET

A. Ratings

1. The generator set shall operate at 1800 rpm and at a voltage of: 120/208 Volts AC, Three phase, 4-wire, 60 hertz.
2. The generator set shall provide the following ratings and performance 0.8 PF, standby rating in order to be considered: Engine Minimum 75HP, with no power derate under: 5000 feet altitude, and ambient temperature up to 104 degrees F.
3. The generator set rating shall be based on emergency/standby service.

B. Performance

1. Voltage regulation shall be plus or minus 1% percent for any constant load between no load and rated load for both parallel and non-parallel applications. Random voltage variation with any steady load from no load to full load shall not exceed plus or minus 0.5 percent.
2. Frequency regulation shall be isochronous from steady state no load to steady state rated load. Random frequency variation with any steady load from no load to full load shall not exceed plus or minus 0.6%.
3. The engine-generator set shall be capable of single step load pick up of 100% nameplate kW and power factor, less applicable derating factors, with the engine-generator set at operating temperature.
4. Motor starting capability @ 30% Voltage Dip in 120/208VAC connection shall be a minimum of 130kVA equipped with PMG Exciter. The generator set shall be capable of sustaining a minimum of 90% of rated no load voltage with the specified kVA load at near zero power factor applied to the generator set.
5. The alternator shall produce a clean AC voltage waveform, with not more than 5% total harmonic distortion at full linear load, when measured from line to neutral, and with not more than 3% in any single harmonic. Telephone influence factor shall be less than 40.

C. Construction

1. The engine-generator set shall be mounted on a heavy-duty steel base to maintain alignment between components. The base shall incorporate a battery tray with hold-down clamps within the rails

2. All switches, lamps, and meters in the control system shall be oil-tight and dust-tight, and the enclosure door shall be gasketed. There shall be no exposed points in the control (with the door open) that operate in excess of 50 volts.

D. Connections

1. The generator set load connections shall be composed of silver or tin plated copper bus bars, drilled to accept mechanical or compression terminations of the number and type as shown on the drawings. Sufficient lug space shall be provided for use with cables of the number and size as shown on the drawings.

2. Power connections to auxiliary devices shall be made at the devices, with required protection located at a wall-mounted common distribution panel.

3. Generator set control interfaces to other system components shall be made on a common, permanently labeled terminal block assembly.

2.03 ENGINE AND ENGINE EQUIPMENT

A. The engine shall be cast iron, Natural Gas fueled, radiator and fan cooled. Minimum displacement shall be 305 cubic inches, with 8 cylinders. The horsepower rating of the engine shall be at least 75HP. Engine accessories and features shall include:

B. Complete engine fuel system, including secondary pressure regulator, fuel flex and wye strainer, and control valves. Package shall operate to full nameplate rating on low pressure fuel between 7” and 14” Water Column pressure – packages requiring elevated pressure fuel system are not acceptable. Fuel consumption at 100% nameplate rated load shall not exceed 530CFH.

C. An electronic governor system shall provide automatic isochronous frequency regulation. The governing system dynamic capabilities shall be controlled as a function of engine coolant temperature to provide fast, stable operation at varying engine operating temperature conditions. The control system shall actively control the fuel rate and excitation as appropriate to the state of the generator set. Fuel rate shall be regulated as a function of starting, accelerating to start disconnect speed, accelerating to rated speed, and operating in various isochronous or parallel states.

D. Skid-mounted radiator and cooling system rated for full load operation in 122 degrees F (50 degrees C) ambient as measured at the generator air inlet, based on 0.5 in H_2O external static head. Radiator shall be sized based on a core temperature that is 20F higher than the rated operation temperature, or prototype tested to verify cooling performance of the engine/radiator/fan operation in a controlled environment. The equipment manufacturer shall fill the cooling system with a 50/50-ethylene glycol/water mixture. Rotating parts shall be guarded against accidental contact.

E. Electric starter(s) capable of three complete cranking cycles without overheating.

F. Positive displacement, mechanical, full pressure, lubrication oil pump.

G. Full flow lubrication oil filters with replaceable spin-on canister elements and dipstick oil level indicator.

H. Replaceable dry element air cleaner with restriction indicator.

I. Flexible fuel line and fuel wye strainer shall be provided.

J. Engine mounted battery charging alternator, 70-ampere minimum, and solid-state voltage regulator.

K. Coolant heater

1. Engine mounted, thermostatically controlled, coolant heater for the engine. Heater voltage shall be 120VAC and rated minimum 1500W. The coolant heater shall be UL499 listed and labeled.

2. The coolant heater shall be installed on the engine with high temperature silicone hose connections. Steel tubing shall be used for connections into the engine coolant system wherever

the length of pipe run exceeds 12 inches. The coolant heater installation shall be specifically designed to provide proper venting of the system. The coolant heaters shall be installed using quick disconnect couplers to isolate the heater for replacement of the heater element. The quick disconnect/automatic sealing couplers shall allow the heater element to be replaced without draining the engine cooling system or significant coolant loss.

3. The coolant heater shall be provided with a 12VDC thermostat, installed at the engine thermostat housing. An AC power connection box shall be provided for a single AC power connection to the coolant heater system.
4. The coolant heater shall be sized as recommended by the engine manufacturer to warm the engine to a minimum of 100F (40C) in a 40F ambient, in compliance with NFPA110 requirements, or the temperature required for starting and load pickup requirements of this specification.

L. Provide integral vibration isolators, or spring/pad type as recommended by the manufacturer, quantity as recommended by the generator set manufacturer.

M. Starting and Control Batteries shall be calcium/lead antimony type, 12 volt DC, sized as recommended by the engine manufacturer, complete with battery cables and connectors.

N. Provide exhaust silencer for the engine as recommended by the generator set manufacturer and approved by the engine manufacturer. Exhaust system shall be installed within the sound attenuated enclosure and not exposed to the elements. Exposed roof mounted or Radiator Duct mounted units do not comply.

O. Provide a minimum 10 amp battery charger. The charger shall include the following capabilities:
1. Chargers shall be UL listed and CSA or CUL certified for use in emergency applications.
2. The charger shall be vibration resistant.
3. The charger shall be fully auto float / equalize type with local LED alarm lights and remote alarm contacts to meet NFPA-110. Charge rates shall be temperature compensated. Charger shall have digital voltage and amperage meter display. Contractor shall install charger at gen set location.

2.04 AC GENERATOR

A. The AC generator shall be; synchronous, four pole, 2/3 pitch, revolving field, drip-proof construction, single prelubricated sealed bearing, air cooled by a direct drive centrifugal blower fan, and directly connected to the engine with flexible drive disc. Alternator rating shall be a minimum of 45KW in site required 120/208VAC Connection at class F Temp Rise. Alternator shall have extended stack, capable of reconnection to provide full nameplate rated output in single phase. Insulation system shall be Class H insulation, with actual temp rise measured by resistance method at full nameplate rated load not exceeding 125 degrees Centigrade or “Class F” temperature rise.

B. The generator shall be capable of delivering rated output (kVA) at rated frequency and power factor, at any voltage not more than 5 percent above or below rated voltage.

C. A permanent magnet generator (PMG) shall be included to provide a reliable source of excitation power for optimum motor starting and short circuit performance. The PMG and controls shall be capable of sustaining and regulating current supplied to a single phase or three phase fault at approximately 300% of rated current for not more than 10 seconds.

D. The subtransient reactance of the alternator shall not exceed 15 percent, based on the standby rating of the generator set.

E. The alternator shall be capable of operation with reverse kVAR of 0.15 per unit.

2.05 GENERATOR SET CONTROL

The generator set shall be provided with a programmable microprocessor-based control system that is designed to provide automatic starting, monitoring, and control functions for the generator set. The control system shall also be designed to allow local monitoring and control of the generator set, and be capable of full remote monitoring and control as a future option.

The control shall be mounted on the generator set. The control shall be vibration isolated and prototype tested to verify the durability of all components in the system under the vibration conditions encountered.

The generator set mounted control shall include the following features and functions:

A. Control Switches

1. Mode Select Switch. The mode select switch shall initiate the following control modes. When in the RUN or MANUAL position the generator set shall start, and accelerate to rated speed and voltage as directed by the operator. A separate push-button to initiate starting is acceptable. In the OFF position the generator set shall immediately stop, bypassing all time delays. In the AUTO position the generator set shall be ready to accept a signal from a remote device to start and accelerate to rated speed and voltage.

2. EMERGENCY STOP switch. Switch shall be Red "mushroom-head" push-button. Depressing the emergency stop switch shall cause the generator set to immediately shut down, and be locked out from automatic restarting.

3. RESET switch. The RESET switch shall be used to clear a fault and allow restarting the generator set after it has shut down for any fault condition.

4. PANEL LAMP switch. Depressing the panel lamp switch shall cause the entire panel to be lighted with DC control power. The panel lamps shall automatically be switched off 10 minutes after the switch is depressed, or after the switch is depressed a second time.

B. Generator Set AC Output Metering. The generator set shall be provided with a metering set including the following features and functions:

1. Digital metering set, 1% accuracy, to indicate generator RMS voltage and current, frequency, output current, output KW, KW-hours, and power factor. Generator output voltage shall be available in line-to-line and line-to-neutral voltages, and shall display all three-phase voltages (line to neutral or line to line) simultaneously.
2. Analog voltmeter, ammeter, frequency meter, power factor meter, and kilowatt (KW) meter. Voltmeter and ammeter shall display all three phases. Meter scales shall be color coded in the following fashion: green shall indicate normal operating condition, amber shall indicate operation in ranges that indicate potential failure, and red shall indicate failure impending. Metering accuracy shall be within 1% at rated output. Both analog and digital metering are required.
3. The control system shall monitor the total load on the generator set, and maintain data logs of total operating hours at specific load levels ranging from 0 to 110% of rated load, in 10% increments. The control shall display hours of operation at less than 30% load and total hours of operation at more than 90% of rated load.
4. The control system shall log total number of operating hours, total kWH, and total control on hours, as well as total values since reset.

C. Generator Set Alarm and Status Display.

The generator set control shall include LED alarm and status indication lamps. The lamps shall be high-intensity LED type. The lamp condition shall be clearly apparent under bright room lighting conditions. Functions indicated by the lamps shall include:

- The control shall include five configurable alarm-indicating lamps. The lamps shall be field adjustable for any status, warning, or shutdown function monitored by the genset. They shall also be configurable for color, and control action (status, warning, or shutdown).
- The control shall include green lamps to indicate that the generator set is running at rated frequency and voltage, and that a remote start signal has been received at the generator set. The running signal shall be based on actual sensed voltage and frequency on the output terminals of the generator set.
- The control shall include a flashing red lamp to indicate that the control is not in automatic state, and red common shutdown lamp.
- The control shall include an amber common warning indication lamp.

D. Engine Status Monitoring.

The following information shall be available from a digital status panel on the generator set control :

engine oil pressure (psi or kPA)
engine coolant temperature (degrees F or C)
engine oil temperature (degrees F or C)
engine speed (rpm)
number of hours of operation (hours)
number of start attempts
battery voltage (DC volts)

The control system shall also incorporate a data logging and display provision to allow logging of the last 10 warning or shutdown indications on the generator set, as well as total time of operation at various loads, as a percent of the standby rating of the generator set.

E. Engine Control Functions.

a) The control system provided shall include a cycle cranking system, which allows for user selected crank time, rest time, and # of cycles. Initial settings shall be for 3 cranking periods of 15 seconds each, with 15-second rest period between cranking periods.

b) The control system shall include an idle mode control, which allows the engine to run in idle mode in the RUN position only. In this mode, the alternator excitation system shall be disabled.

c) The control system shall include an engine governor control, which functions to provide steady state frequency regulation as noted elsewhere in this specification. The governor control shall include adjustments for gain, damping, and a ramping function to control engine speed and limit exhaust smoke while the unit is starting.

d) The control system shall include time delay start (adjustable 0-300 seconds) and time delay stop (adjustable 0-600 seconds) functions.

e) The control system shall include sender failure monitoring logic for speed sensing, oil pressure, and engine temperature which is capable of discriminating between failed sender or wiring components, and an actual failure conditions.

F. Alternator Control Functions:

a) The generator set shall include a full wave rectified automatic digital voltage regulation system that is matched and prototype tested by the engine manufacturer with the governing system provided. It shall be immune from missoperation due to load-induced voltage waveform distortion and provide a pulse width modulated output to the alternator exciter. The voltage regulation system shall be equipped with three-phase line to neutral RMS sensing and shall control buildup of AC generator voltage to provide a linear rise and limit overshoot. The system shall include a torque-matching characteristic, which shall reduce output voltage in proportion to frequency below an adjustable frequency threshold. Torque matching characteristic shall be adjustable for roll-off frequency and rate, and be capable of being curve-matched to the engine torque curve with adjustments in the field. The voltage regulator shall include adjustments for gain, damping, and frequency roll-off. Adjustments shall be broad range, and made via digital raise-lower switches, with an alphanumeric LED readout to indicate setting level. Rotary potentiometers for system adjustments are not acceptable.

b) Controls shall be provided to monitor the output current of the generator set and initiate an alarm (over current warning) when load current exceeds 110% of the rated current of the generator set on any phase for more than 60 seconds. The controls shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (over current shutdown). The protective functions provided shall be in compliance to the requirements of NFPA70 article 445. The protection for this function shall be 3rd party certified to verify performance.

c) Controls shall be provided to individually monitor all three phases of the output current for short circuit conditions. The control/protection system shall monitor the current level and voltage. The controls shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (short circuit shutdown). The protective functions provided shall be in compliance to the requirements of NFPA70 article 445. The protection for this function shall be 3rd party certified to verify performance.

d) Controls shall be provided to monitor the KW load on the generator set, and initiate an alarm condition (over load) when total load on the generator set exceeds the generator set rating for in excess of 5 seconds. Controls shall include a load shed control, to operate a set of dry contacts (for use in shedding customer load devices) when the generator set is overloaded.

e) A line to neutral sensing AC over/under voltage monitoring system that responds only to true RMS voltage conditions shall be provided. The system shall initiate shutdown of the generator set when alternator output voltage exceeds 110% of the operator-set voltage level for more than 10 seconds, or with no intentional delay when voltage exceeds 130%. Under voltage shutdown shall occur when the output voltage of the alternator is less than 85% for more than 10 seconds.

G. Other Control Functions

a) A battery monitoring system shall be provided which initiates alarms when the DC control and starting voltage is less than 13.6VDC or more than 16 VDC. During engine cranking (starter engaged), the low voltage limit shall be disabled, and DC voltage shall be monitored as load is applied to the battery, to detect impending battery failure or deteriorated battery condition.

H. Control Interfaces for Remote Monitoring:

The control system shall provide four programmable output relays. These relay outputs shall be configurable for any alarm, shutdown, or status condition monitored by the control. The relays shall be configured to indicate: (1) generator set operating at rated voltage and frequency, (2) common warning, (3) common shutdown, (4) load shed command.

A fused 10 amp switched 12VDC power supply circuit shall be provided for customer use. DC power shall be available from this circuit whenever the generator set is running.

A fused 10 amp 12VDC power supply circuit shall be provided for customer use. DC power shall be available from this circuit at all times from the engine starting/control batteries.

2.06 OTHER EQUIPMENT

A. Provide and install a 20-light LED type remote alarm annunciator with horn, located as shown on the drawings or in a location that can be conveniently monitored by facility personnel. The remote annunciator shall provide all the audible and visual alarms called for by NFPA Standard 110 for level 1 systems for the local generator control panel. Spare lamps shall be provided to allow future addition of other alarm and status functions to the annunciator. Provisions for labeling of the annunciator in a fashion consistent with the specified functions shall be provided. Alarm silence and lamp test switch(es) shall be provided. LED lamps shall be replaceable, and indicating lamp color shall be capable of changes needed for specific application requirements. Alarm horn shall be switchable for all annunciation points. Alarm horn (when switched on) shall sound for first fault, and all subsequent faults, regardless of whether first fault has been cleared, in compliance with NFPA110 3-5.6.2. The interconnecting wiring between the annunciator and other system components shall be monitored and failure of the interconnection between components shall be displayed on the annunciator panel.

B. The generator set shall be provided with a mounted main line circuit breaker, sized at 150 Amps, to carry the rated output current of the generator set. The circuit breaker shall incorporate an electronic trip unit that operates to protect the alternator under all overcurrent conditions, or a thermal-magnetic trip with other overcurrent protection devices that positively protect the alternator under overcurrent conditions. The supplier shall submit time overcurrent characteristic curves and thermal damage curve for the alternator, demonstrating the effectiveness of the protection provided.

C. Outdoor Weather-Protective Enclosure

1. The generator set shall be provided with an outdoor weatherproof, sound-attenuated enclosure. Housing shall provide ample airflow for generator set operation at rated load in an ambient temperature of 100F. The housing shall have hinged access doors as required to maintain easy access for all operating and service functions. All doors shall be lockable, keyed alike. Electrical power and control connections shall be made within the perimeter of the enclosure. Fuel connection shall also be within enclosure perimeter.

2. All sheet metal shall be primed for corrosion protection and finish painted with the manufacturer's standard color using a two-step electrocoating paint process, or equal meeting the performance requirements specified below. All surfaces of all metal parts shall be primed and painted.

3. Painting of hoses, clamps, wiring harnesses, and other non-metallic service parts shall not be acceptable. Fasteners used shall be corrosion resistant, and designed to minimize marring of the painted surface when removed for normal installation or service work.

4. A factory-mounted exhaust silencer shall be installed inside the enclosure. The exhaust shall exit the enclosure through a rain collar and terminate with a rain cap. Exhaust connections to the generator set shall be through seamless flexible connections.

5. The enclosure shall include the following maintenance provisions:

a. Flexible coolant and lubricating oil drain lines, that extend to the exterior of the enclosure, with internal drain valves

b. External radiator fill provision.

6. The generator set housing shall be sound-attenuated which allows the generator set to operate at full rated load in an ambient temperature of up to 100F. The enclosure shall reduce the sound level of the generator set while operating at full nameplate rated load to an average of 63 dBA at 7 meters from the generator set in a free field environment.

7. The enclosure shall be insulated with non-hydroscopic materials.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install securely, in a neat and workmanlike manner, as specified in NECA/EGSA 404.

C. Equipment shall be installed by the contractor in accordance with final submittals and contract documents. Installation shall comply with applicable state and local codes as required by the authority having jurisdiction. Install equipment in accordance with manufacturer's instructions and instructions included in the listing or labeling of UL listed products.

D. Installation of equipment shall include furnishing and installing all interconnecting wiring between all major equipment provided for the on-site power system. The contractor shall also perform interconnecting wiring between equipment sections (when required), under the supervision of the equipment supplier.

E. Equipment shall be installed on concrete housekeeping pads. Equipment shall be permanently fastened to the pad in accordance with manufacturer’s instructions and seismic requirements of the site.

F. Equipment shall be initially started and operated by representatives of the manufacturer.

G. All equipment shall be physically inspected for damage. Scratches and other installation damage shall be repaired prior to final system testing. Equipment shall be thoroughly cleaned to remove all dirt and construction debris prior to initial operation and final testing of the system.

3.02 OPERATION

A. Sequence of Operation

1. Generator set shall start on receipt of a start signal from remote equipment. The start signal shall be via hardwired connection to the generator set control.

2. The generator set shall complete a time delay start period as programmed into the control.

3. The generator set control shall initiate the starting sequence for the generator set. The starting sequence shall include the following functions:

a. The control system shall verify that the engine is rotating when the starter is signaled to operate. If the engine does not rotate after two attempts, the control system shall shut down and lock out the generator set, and indicate “fail to crank” shutdown.

b. The engine shall fire and accelerate as quickly as practical to start disconnect speed. If the engine does not start, it shall complete a cycle cranking process as described elsewhere in this specification. If the engine has not started by the completion of the cycle cranking sequence, it shall be shut down and locked out, and the control system shall indicate “fail to start”.

c. The engine shall accelerate to rated speed and the alternator to rated voltage. Excitation shall be disabled until the engine has exceeded programmed idle speed, and regulated to prevent over voltage conditions and oscillation as the engine accelerates and the alternator builds to rated voltage.

4. On reaching rated speed and voltage, the generator set shall operate as dictated by the control system in isochronous state.

5. When all start signals have been removed from the generator set, it shall complete a time delay stop sequence. The duration of the time delay stop period shall be adjustable by the operator.

6. On completion of the time delay stop period, the generator set control shall switch off the excitation system and shall shut down.

a. Any start signal received after the time stop sequence has begun shall immediately terminate the stopping sequence and return the generator set to isochronous operation.

3.03 FACTORY TESTING

A. The generator set manufacturer shall perform a complete operational test on the generator set prior to shipping from the factory. A certified test report shall be provided. Equipment supplied shall be fully tested at the factory for function and performance.

B. Generator set factory tests on the equipment shall be performed at rated load and rated power factor. Generator sets that have not been factory tested at rated power factor will not be acceptable. Tests shall include: run at full load, maximum power, voltage regulation, transient and steady-state governing, single step load pickup, and function of safety shutdowns.

3.04 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 01 4000.

B. Provide full load test utilizing portable test bank, if required, for four hours minimum. Simulate power failure including operation of transfer switch, automatic starting cycle, and automatic shutdown and return to normal.

C. Record in 20 minute intervals during four hour test:

1. Kilowatts.

2. Amperes.

3. Voltage.

4. Coolant temperature.

5. Room temperature.

6. Frequency.

7. Oil pressure.

D. Test alarm and shutdown circuits by simulating conditions.

3.05 MANUFACTURER'S FIELD SERVICES

A. Provide the services of manufacturer's representative to prepare and start system.

1. AFTER HOURS START UP shall be allowed for in base bid price.

2. The complete installation shall be tested for compliance with the specification following completion of all site work. Testing shall be conducted by representatives of the manufacturer, with required fuel supplied by Contractor. The Engineer shall be notified in advance and shall have the option to witness the tests.

3. Installation acceptance tests to be conducted on-site shall include a "cold start" test, a one hour full load test, and a one-step rated load pickup test. Provide a resistive load bank rated for package full nameplate rating and make temporary connections for full load test.

4. Perform a power failure test on the entire installed system. This test shall be conducted by opening the power supply from the utility service, and observing proper operation of the system for at least 1/2 hour. Coordinate timing and obtain approval for start of test with site personnel.

B. Provide on-site training for Owner personnel.

1. The equipment supplier shall provide Two Separate training classes for the facility operating personnel covering operation and maintenance of the equipment provided. Each training program shall be not less than 1 hour in duration and the class size shall be limited to 5 persons. Initial Training date shall be at the time of equipment start up, with a second return training date within the first six months to be coordinated with the facility owner and maintenance personnel – Both training trips shall be included in the package base bid price.

C. Service and Support.

1. The manufacturer of the generator set shall maintain service parts inventory at a central location which is accessible to the service location 24 hours per day, 365 days per year.

2. The generator set shall be serviced by the manufacturer's local distributor service organization that is trained and factory certified in generator set service. The supplier shall maintain an inventory of critical replacement parts at the local service organization, and in service vehicles. The service organization shall be on call 24 hours per day, 365 days per year.

3. The manufacturer shall maintain model and serial number records of each generator set provided for at least 20 years.

4. The local distributor service technicians shall be equipped with a plug in diagnostic tool to allow reading of package history, and programming or updating of package controls.

5. Distributor shall be fully authorized to perform any and all levels of warranty service and repair to the unit including: Engine, Controls, Alternator and ATS.

6. The Local Distributor shall have an in house rental generator fleet with equipment available within 4 hours and of a size to back up this facility.

7. Distributor Parts, Service, Rental & Warranty support are not assignable to others or any 3rd parties.

8. Distributor full time service support shall be available on site within 2 hours.

3.06 ADJUSTING

A. Adjust generator output voltage and engine speed.

3.07 CLEANING

A. Clean engine and generator surfaces. Replace oil and fuel filters.

3.08 DEMONSTRATION

A. Describe loads connected to emergency system and restrictions for future load additions.

B. Simulate power outage by interrupting normal source, and demonstrate that system operates to provide emergency power.

END OF SECTION

SECTION 26 3600

AUTOMATIC TRANSFER SWITCHES

PART 1 GENERAL

1.01 SCOPE

A. Provide complete factory assembled power transfer equipment with field programmable digital electronic controls designed for fully automatic operation and including: surge voltage isolation, voltage sensors on all phases of both sources, linear operator, permanently attached manual handles, positive mechanical and electrical interlocking, and mechanically held contacts for both sources.

B. The generator set manufacturer shall warrant transfer switches to provide a single source of responsibility for all the products provided. Technicians specifically trained to support the product and employed by the generator set supplier shall service the transfer switches.

1.02 REFERENCES, CODES AND STANDARDS

A. NFPA 70 - National Electrical Code; National Fire Protection Association.

B. The automatic transfer switch installation and application shall conform to the requirements of the following codes and standards:

1. NFPA70 – National Electrical Code. Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702.
2. NFPA110 – Emergency and Standby Power Systems. The transfer switch shall meet all requirements for Level 1 systems.
3. IEEE446 – Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications.
4. NEMA ICS10-1993 – AC Automatic Transfer Switches.

C. The transfer switch assembly shall comply with the following standards:

1. IEEE 62.41, AC Voltage Surge Immunity.
2. IEEE 62.45, AC Voltage Surge.
3. UL1008 – Transfer Switches. Transfer switches shall be UL1008 listed. UL1008 transfer switches may be supplied in UL891 enclosures if necessary to meet the physical requirements of the project.

D. The transfer switch manufacturer shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying quality assurance in design/development, production, installation, and service, in accordance with ISO 9001.

1.03 SUBMITTALS

A. Product Data: Provide catalog sheets showing voltage, switch size, ratings and size of switching and overcurrent protective devices, operating logic, short circuit ratings, dimensions, and enclosure details.

B. Shop Drawings: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified.

1. Dimensioned outline drawings of assembly, including elevations, sections, and details including minimal clearances, conductor entry provisions, gutter space, installed features and devices and material lists for each switch specified.

2. Internal electrical wiring and control drawings.
3. Internal electrical wiring and control drawings.
4. Installation and mounting instructions.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

D. Operation Data: Instructions for operating equipment under emergency conditions when engine generator is running.

E. Maintenance Data: Routine preventative maintenance and lubrication schedule. List special tools, maintenance materials, and replacement parts.

1.04 WARRANTY

A. Warranty: The ATS shall be provided with a Five Year Comprehensive warranty covering parts and labor travel time and mileage for the full duration with no deductibles. This warranty shall be equivalent in support to the generator set warranty and the service organization shall be fully authorized to perform all facets of inspection, repair, warranty, etc..

1.05 FACTORY TESTING

A. The transfer switch manufacturer shall perform a complete operational test on the transfer switch prior to shipping from the factory. A certified test report shall be available on request. Test process shall include calibration of voltage sensors.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience and with service facilities within 100 miles (160 km) of Project.

C. Supplier Qualifications: Authorized distributor of specified manufacturer with minimum three years documented experience.

D. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

E. Source Limitations: All transfer switches are to be obtained through one source from a single manufacturer. The generator set manufacturer shall warrant transfer switches to provide a single source of responsibility for products provided. If ASCO or Russel ATS are provided the system start up service, training and return trip for second training within six months shall all be performed by the ATS distributor's factory certified service technicians – this is not assignable to "dealers", engine houses, or gen set distributor service. All start up service, training, etc. shall be performed by ATS Distributor Service technicians that are factory certified for any and all levels of Programming, service, and warranty repair for quoted ATS.

1.07 MAINTENANCE SERVICE

A. Provide service and maintenance of transfer switches for one year from Date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Same as the stand by generator manufacturer – Cummins Power Generation, Model OTPC.

B. Russelectric, Model RMT with Time Delay Transfer.

C. ASCO 7000 – Series with Time Delay Transfer.

D. Equipment specifications for this Project are based on automatic transfer switches manufactured by Cummins Power Generation. Switches manufactured by Russelectric or ASCO that meet the requirement of this specification are acceptable, if approved not less than two weeks before scheduled bid date. Proposals must include a line-by-line compliance statement based on this specification.

2.02 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

A. Provide transfer switch for 120/208VAC three phase, four wire service, rated 150 Amps. Current Rating as defined in UL 1008 for continuous loading and total system transfer.

B. Fault-Current Closing and Withstand Ratings: UL 1008 WCR ratings must be specifically listed as meeting the requirements for use with protective devices at installation locations, under specified fault conditions. Withstand and closing ratings shall be based on use of the same set of contacts for the withstand test and the closing test.

C. Solid-State Controls: All settings should be accurate to +/- 2% or better over an operating temperature range of - 40 to + 60 degrees C (- 40 to + 140 degrees F).

D. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.

E. Electrical Operation: Accomplished by a non-fused, momentarily energized solenoid or electric motor operator mechanism, mechanically and electrically interlocked in both directions (except that mechanical interlock is not required for closed transition switches).

F. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.

1. Switches using molded-case switches or circuit breakers, or insulated case circuit breaker components are not acceptable.
2. Transfer switches shall be double-throw, electrically and mechanically interlocked, and mechanically held in the Source 1 and Source 2 positions.
3. Main switch contacts shall be high-pressure silver alloy. Contact assemblies shall be rated for 600VAC, have arc chutes for positive arc extinguishing. Arc chutes shall have insulating covers to prevent inter-phase flashover.
4. Contacts shall be operated by a high-speed electrical mechanism that causes contacts to open or close within three electrical cycles from signal.
5. The transfer switch operation shall include the ability to switch to an open position (both sources disconnected) for the purpose of load shedding from the generator set.
6. The power transfer mechanism shall include provisions for manual operation under load with the enclosure door closed. Manual operation may be electromechanical or mechanical, but must be coordinated with control function.
7. Transfer switch shall be provided with flame retardant transparent covers to allow viewing of switch contact operation but prevent direct contact with components that could be operating at line voltage levels.
8. The transfer switch shall include the mechanical and control provisions necessary to allow the device to be field-configured for operating speed. Transfer switch operation with motor loads shall be as is recommended in NEMA MG1, with Center off delay.
   a. Phase angle monitoring/timing equipment is not an acceptable substitute for this functionality

9. Transfer switches designated on the drawings as “3-pole” shall have a full current-rated neutral bar with lugs.

G. Control: Transfer switch control shall be capable of being equipped to allow communicating with the genset control, other switches and remote programming devices over a high-speed network interface. This is not a part of the base bid specification for the project.

H. Factory wiring: Transfer switch internal wiring shall be composed of pre-manufactured harnesses that are permanently marked for source and destination. Harnesses shall be connected to the control system by means of locking disconnect plug(s), to allow the control system to be easily disconnected and serviced without disconnecting power from the transfer switch mechanism

I. Terminals: Terminals shall be pressure type and appropriate for all field wiring. Terminal arrangement and cabinet space must be such that feeder conductors can enter from the top, side or bottom of the switch, at the installer’s discretion. Control wiring shall be equipped with suitable lugs, for connection to terminal strips.

J. Enclosures: All enclosures shall be third-party certified for compliance to NEMA ICS 6 and UL 508, unless otherwise indicated:

1. The enclosure shall provide wire bend space in compliance to the latest version of NFPA70, regardless of the direction from which the conduit enters the enclosure.
2. Exterior cabinet doors shall provide complete protection for the system’s internal components. Doors must have permanently mounted key-type latches. Bolted covers or doors are not acceptable.
3. Transfer switches shall be provided in enclosures that are third party certified for their intended environment per NEMA requirements.
   a. Transfer switches mounted in a controlled indoor environment shall be provided in NEMA Type 1 enclosures (IEC type IP30).

2.03 AUTOMATIC TRANSFER SWITCHES

A. Comply with requirements for Level 1 equipment according to NFPA 110.

B. Indicated current ratings:

1. Transfer switch, 150 Amp, 30,000KAIC rating, 3 poles, with solid N bar, 120/208VAC three phase, four wire, NEMA 1 enclosure.
2. Main contacts shall be Industrial Contactor type, rated for 600 VAC minimum.
3. Transfer switches shall be rated to carry 100% of rated current continuously in the enclosure supplied, in ambient temperatures of -40 to +60 degrees C (-40 to +140 degrees F), relative humidity up to 95% (non-condensing), and altitude up to 10,000 feet.

C. Manual Switch Operation: The power transfer mechanism shall include permanently attached manual operating handle for service use and operation without load.

D. Relay Signal: Control shall include a set of relays to signal status: Source 1 & 2 Connected/Available, Not in Auto, test/exercise, failed to transfer/retransfer, pre-transfer relay signal, which shall be adjustable from 0 to 50 seconds.

E. Control: Transfer switch control shall be capable of upgrade to provide communication with the genset control, remote annunciation equipment, and other devices over a high speed network. This feature is not part of the base bid specification

F. Transfer switches that are designated on the drawings as 3-pole shall be provided with a neutral bus and lugs. The neutral bus shall be sized to carry 100% of the current designated on the switch rating.

G. Automatic Transfer Switch Control Features

1. The transfer switch control system shall be configurable in the field for any operating voltage level up to 600 VAC. Voltage sensing shall be monitored based on the normal voltage at the site. Systems that utilize voltage monitoring based on standard voltage conditions that are not field configurable are not acceptable.
2. All transfer switch sensing shall be configurable from an operator panel or from a Windows XP or later PC-based service tool. Designs utilizing DIP switches or other electromechanical devices are not acceptable.
3. The transfer switch shall be configurable to accept a relay contact signal and a network signal from an external device to prevent transfer to the generator service.
4. The transfer switch shall provide a relay contact signal prior to transfer or re-transfer. The time period before and after transfer shall be adjustable in a range of 0 to 50 seconds.
5. The control system shall be designed and prototype tested for operation in ambient temperatures from - 40 degrees C to + 60 degrees C (- 40 to +140 degrees F). It shall be designed and tested to comply with the requirements of the noted voltage and RFI/EMI standards.
6. The control shall have optically isolated logic inputs, high isolation transformers for AC inputs and relays on all outputs, to provide optimum protection from line voltage surges, RFI and EMI.

H. Transfer Switch Control Panel: The transfer switch shall have a programmable microprocessor-based control with a sealed membrane panel incorporating pushbuttons for operator-controlled functions, and LED lamps for system status indicators. The panel shall also include an alphanumeric display for detailed system information. Panel display and indicating lamps shall include permanent labels.

1. The indicator panel LEDs shall display:

   a. Which source the load is connected to (Source 1 or Source 2)
   b. Which source or sources are available
   c. When switch is not set for automatic operation, because the control is disabled or the bypass switch is in use
   d. When the switch is in test/exercise mode

2. The indicator shall have pushbuttons that allow the operator to activate the following functions:

   a. Activate pre-programmed test sequence
   b. Override programmed delays, and immediately go to the next operation
   c. Reset the control by clearing any faults
   d. Test all of the LEDs by lighting them simultaneously

3. The alphanumeric digital display shall be vacuum fluorescent-type, clearly visible in both bright sunlight and no-light conditions over an angle of 120 degrees, and shall display the following:

   a. AC voltage for all phases, normal and emergency
   b. Source status: connected or not connected.
   c. Load data, including voltage, AC current, frequency, KW, KVA, and power factor.

4. The display panel shall be password-protected, and allow the operator to view and make adjustments:

   a. Set nominal voltage and frequency for the transfer switch
   b. Adjust voltage and frequency sensor operation set points
   c. Set up time clock functions
   d. Set up load sequence functions
   e. Enable or disable control functions including program transition
   f. View real-time clock data, operation log (hours connected, times transferred, failures) and service history

I. Control Functions: Functions managed by the control shall include:

1. Software adjustable time delays:

   a. Engine start (prevents nuisance genset starts in the event of momentary power fluctuation): 0 to 120 seconds (default 3 sec)
   b. Transfer normal to emergency (allows genset to stabilize before load is transferred): 0 to 120 seconds (default 3 sec)
   c. Re-transfer emergency to normal (allows utility to stabilize before load is transferred from genset): 0 to 30 minutes (default 3 sec)
   d. Engine cooldown: 0 to 30 minutes (default 10 min)
   e. Programmed transition: 0 to 60 seconds (default 3 sec)

2. Undervoltage sensing: three-phase normal, <u>three-phase emergency</u> source.

   a. Pickup: 85 to 98% of nominal voltage (default 90%)
   b. Dropout: 75 to 98% of nominal voltage (default 90%)
   c. Dropout time delay: 0.1 to 1.0 seconds (default 0.5 sec)
   d. Accurate to within +/- 1% of nominal voltage

3. Over-voltage sensing: three-phase normal, <u>three-phase emergency</u> source.

   a. Pickup: 95 to 99% of dropout setting (default 95%)
   b. Dropout: 105 to 135% of nominal voltage (default 110%)
   c. Dropout time delay: 0.5 to 120 seconds (default 3 sec)
   d. Accurate to within +/- 1% of nominal voltage

4. Over/under frequency sensing:

   a. Pickup: +/- 5 to +/-20% of nominal frequency (default 10%)
   b. Dropout: +/-1% beyond pickup (default 1%)
   c. Dropout time delay: 0.1 to 15.0 seconds (default 5 sec)
   d. Accurate to within +/- 0.2%

5. <u>Voltage imbalance</u> sensing:

   a. Dropout: 2 to 10% (default 4%)
   b. Pickup: 90% of dropout
   c. Time delay: 2.0 to 20 seconds (default 5 sec)

6. Phase rotation sensing:

   a. Time delay: 100 msec

7. Loss of single-phase detection:

   a. Time delay: 100 msec

J. Control features shall include:

1. Programmable genset exerciser: A field-programmable control shall periodically start the generator, transfer the load to generator for a preset time, then re-transfer and shut down the generator after a preset cool-down period.

   a. Push-button programming control shall have a selection of eight different schedules for exercising generator, with or without load.

2. In event of a loss of power to the control, all control settings, real-time clock setting and the engine start-time delay setting will be retained.
3. The system continuously logs information including the number of hours each source has been connected to the load, the number of times transferred, and the total number of times each source has failed. An event recorder stores information, including time and date-stamp, for up to 50 events.
4. Transfer Override Switch: Overrides automatic re-transfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light to indicate override status.

K. Control Interface

1. Provide one set Form C auxiliary contacts on both sides, operated by transfer switch position, rated 10 amps 250 VAC.
2. Unassigned Auxiliary Contacts: Two normally open, 1-pole, double-throw contacts for each switch position, rated 10A at 240 VAC.

L. Engine Starting Contacts

1. One isolated and normally closed, and one isolated and normally open; rated 10A at 32VDC.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surface is suitable for transfer switch installation.

3.02 SEQUENCE OF OPERATION

A. Transfer switch normally connects an energized utility power source (source 1) to loads and a generator set (source 2) to the loads when normal source fails. The normal position of the transfer switch is source 1 (connected to the utility), and no start signal is supplied to the genset.

B. Generator Set Exercise (Test) With Load Mode. The control system shall be configurable to test the generator set under load. In this mode, the transfer switch shall control the generator set in the following sequence:

1. Transfer switch shall initiate the exercise sequence at a time indicated in the exercise timer program, or when manually initiated by the operator.

2. When the control systems senses the generator set at rated voltage and frequency, it shall operate to connect the loads to the generator set by opening the normal source contacts,

and closing the alternate source contacts a predetermined time period later. The timing sequence for the contact operation shall be programmable in the controller.

3. The generator set shall operate connected to the load for the duration of the exercise period. If the generator set fails during this period, the transfer switch shall automatically reconnect the generator set to the normal service.

4. On completion of the exercise period, the transfer switch shall operate to connect the loads to the normal source by opening the alternate source contacts, and closing the normal source contacts a predetermined time period later. The timing sequence for the contact operation shall be programmable in the controller.

5. The transfer switch shall operate the generator set unloaded for a cooldown period, and then remove the start signal from the generator set. If the normal power fails at any time when the generator set is running, the transfer switch shall immediately connect the system loads to the generator set.

C. Generator Set Exercise (Test) Without Load Mode. The control system shall be configurable to test the generator set without transfer switch load connected. In this mode, the transfer switch shall control the generator set in the following sequence:

1. Transfer switch shall initiate the exercise sequence at a time indicated in the exercise timer program, or when manually initiated by the operator.

2. When the control systems senses the generator set at rated voltage and frequency, it shall operate the generator set unloaded for the duration of the exercise period.

3. At the completion of the exercise period, the transfer switch shall remove the start signal from the generator set. If the normal power fails at any time when the generator set is running, the transfer switch shall immediately connect the system loads to the generator set.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

3.04 SERVICE AND SUPPORT

A. The manufacturer of the transfer switch shall maintain service parts inventory at a central location which is accessible to the service location 24 hours per day, 365 days per year.

B. The transfer switch shall be serviced by a local service organization that is trained and factory certified in both generator set and transfer switch service. The supplier shall maintain an inventory of critical replacement parts at the local service organization, and in service vehicles. The service organization shall be on call 24 hours per day, 365 days per year. The local service organization shall have permanent service support facilities within a 1-1/2 hour response time of the project site.

C. The manufacturer shall maintain model and serial number records of each transfer switch provided for at least 20 years.

3.05 MANUFACTURER'S FIELD SERVICES

A. Provide the services of the manufacturer's technical representative to check out transfer switch connections and operations and place in service.

B. AFTER HOURS - Allowance shall be made in the base bid for after Hours start up and testing of the system as this package is being added to an existing building, and the owner wishes to minimize service interruption.

C. After generator set installation, the generator and transfer switch supplier shall conduct two complete operation, basic maintenance, and emergency service seminars covering generator set and transfer switch equipment, for up to 5 people employed by the Owner. The first will be performed at the time of equipment start up, with the second trip coordinated with the owner

during the first 6 months of operation.

1. The seminar shall include instruction on operation of the ATS equipment, normal testing and exercise, adjustments to the control system, and emergency operation procedures.
2. The class duration shall be at least 1 hour in length, and include practical operation with the installed equipment.
3. Both classes shall be performed by the ATS distributor's full time field service technician on site – this is not assignable to dealers or any other third party.
4. Both training sessions shall be allowed for in the base bid price.

3.06 DEMONSTRATION

A. Demonstrate operation of transfer switch in bypass, normal, and emergency modes.

3.07 SERVICE AND SUPPORT

A. The manufacturer distributor technician shall be fully authorized to perform any level of service, maintenance, warranty work and programming/upgrades to the ATS. The distributor service technician shall be equipped a service tool with the following features and capabilities:

1. Allow adjustment of all functions described herein, adjustment of operating levels of all protective functions, and programming of all optional functions in the controller.
2. Capable of storing and displaying data for any function monitored by the control.
3. The tool shall automatically record all control operations and adjustments performed by any operator or software user, for tracking of changes to the control.
4. The service tool shall display all warning, shutdown, and status changes programmed into transfer switch controller. For each event, the control shall provide information on the nature of the event, when it last occurred, and how many times it has occurred.
5. ATS Manufacturer's Authorized Distributor's Full time ATS Field service technician shall be available on site within two hours of call – not assignable to sales, dealers or other third party.

END OF SECTION

SECTION 26 5100

INTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interior luminaires.

B. Ballasts.

C. Lamps.

1.02 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.

B. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; National Electrical Contractors Association.

C. NECA/IESNA 502 - Standard for Installing Industrial Lighting Systems; National Electrical Contractors Association.

D. NFPA 70 - National Electrical Code; National Fire Protection Association.

E. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures; National Fire Protection Association.

F. UL 1598 - Luminaires; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. Shop Drawings: Indicate dimensions and components for each fixture that is not a standard product of the manufacturer.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.

C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

D. Operation and Maintenance Data: Instructions for each product including information on replacement parts.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Conform to requirements of NFPA 70 and NFPA 101.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years documented experience.

1.05 EXTRA MATERIALS

A. Furnish two of each plastic lens type.

B. Furnish 5%, not less than 4, replacement lamps for each lamp type.

C. Furnish two of each ballast type.

1.06 SUBSTITUTION ITEMS REQUIRING PRIOR APPROVAL

A. All items that the CONTRACTOR proposes to use in the work, that are not specifically named in the contract documents, must be submitted for review/approval. Such items must be submitted in duplicate to the ARCHITECT and/or ENGINEER for approval a minimum of ten (10) days prior to bid opening. Requests for prior approval must be accompanied by complete catalog information, including but not limited to, model, size, accessories, complete electrical information and performance data in the form given in the equipment schedule on the drawings at stated design conditions. Where items are referred to by symbolic designations on the drawings, all requests for prior approval shall bear the same designations.

B. Lighting Substitutions:

1. Furnish lighting fixtures as scheduled on drawings.
2. Lighting fixture substitutions may be considered for approval by the ARCHITECT/ENGINEER only if all of the following criteria are met:
   a. Provide specification cut sheets marked-up to clearly identify the proposed luminaire including features, options, accessories, etc. required to match products indicated in the schedules.
   b. Submit all cut sheets, etc. to the ARCHITECT/ENGINEER no less than 10 days prior to bid date. Substitutions submitted after this date will not be considered.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Lithonia Lighting.

B. Cooper Lighting.

C. Hubbell Lighting.

D. Or as noted in lighting schedule on the drawings.

2.02 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

C. Provide products that comply with requirements of NFPA 70 and NFPA 101.

D. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

E. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

F. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.

G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

2.03 LUMINAIRES

A. Furnish products as indicated in Schedule included on the Drawings.

2.04 BALLASTS

A. All Ballasts:

1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.

2.05 LAMPS

A. All Lamps:

1. Unless explicitly excluded, provide new, compatible, operable lamps in each luminaire.
2. Verify compatibility of specified lamps with luminaires to be installed. Where lamps are not specified, provide lamps per luminaire manufacturer's recommendations.
3. Minimum Efficiency: Provide lamps complying with all current applicable federal and state lamp efficiency standards.
4. Color Temperature Consistency: Unless otherwise indicated, for each type of lamp furnish products which are consistent in perceived color temperature. Replace lamps that are determined by the ENGINEER to be inconsistent in perceived color temperature.

B. Lamp Types: As specified for each fixture.

C. Fluorescent Lamps:

1. T8 lamps shall be rapid start, 4,100K temperature lamps, unless noted otherwise.
2. Manufacturers:
   a. Osram Sylvania.
   b. General Electric.
   c. Phillips.

PART 3 EXECUTION

3.01 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 0537 as required for installation of luminaires provided under this section.

B. Install products according to manufacturer's instructions.

C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship), NECA 500 (commercial lighting), and NECA 502 (industrial lighting).

D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

E. Support luminaires independent of ceiling framing.

F. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.

G. Install surface mounted luminaires plumb and adjust to align with building lines and with each other. Secure to prevent movement.

H. Install recessed luminaires to permit removal from below.

I. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.

J. Install clips to secure recessed grid-supported luminaires in place.

K. Install wall mounted luminaires at height as indicated on Drawings.

L. Install accessories furnished with each luminaire.

M. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within fixture; use flexible conduit.

N. Connect luminaires to branch circuit outlets provided under Section 26 0537 using flexible conduit.

O. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.

P. Bond products and metal accessories to branch circuit equipment grounding conductor.

Q. Install specified lamps in each luminaire.

R. All night lights, emergency lights, and exit signs shall be circuited from the unswitched hot leg of the general lighting circuit for the area served by the night/emergency/exit lights.

S. Coordinate location of emergency battery ballast unit remote test switch/charge light with Architect prior to rough-in.

T. Remote mount battery packs for emergency ballasts in ceiling spaces above heated areas for outdoor emergency fixtures.

3.02 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for additional requirements.

B. Inspect each product for damage and defects.

C. Operate each luminaire after installation and connection to verify proper operation.

D. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by ENGINEER.

3.03 ADJUSTING

A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by ENGINEER. Secure locking fittings in place.

B. Aim and adjust fixtures as indicated.

3.04 CLEANING

A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

B. Clean electrical parts to remove conductive and deleterious materials.

C. Remove dirt and debris from enclosures.

D. Clean finishes and touch up damage.

3.05 CLOSEOUT ACTIVITIES

3.06 PROTECTION

A. Relamp luminaires that have failed lamps at Substantial Completion.

3.07 SCHEDULE - See Drawings

END OF SECTION

SECTION 26 5600

EXTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Exterior luminaires.

B. Ballasts.

C. Lamps.

1.02 REFERENCE STANDARDS

A. ANSI C82.1 - American National Standard for Lamp Ballast - Line Frequency Fluorescent Lamp Ballast.

B. ANSI C82.4 - American National Standard for Ballasts for High-Intensity-Discharge and Low Pressure Sodium Lamps (Multiple-Supply Type).

C. ANSI O5.1 - American National Standard for Wood Poles -- Specifications and Dimensions.

D. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association.

E. NECA/IESNA 501 - Recommended Practice for Installing Exterior Lighting Systems.

F. NFPA 70 - National Electrical Code; National Fire Protection Association.

G. UL 1598 - Luminaires; Current Edition, Including All Revisions.

1.03 SUBMITTALS

A. Shop Drawings: Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.

C. Test Reports: Indicate measured illumination levels.

D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

E. Operation and Maintenance Data: Instructions for each product including information on replacement parts.

1.04 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum 10 years documented experience.

C. Electrical Components: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

D. All lighting systems shall provided/installed to meet applicable building codes (i.e. N.E.C, Life Safety Code NFPA 101, Energy Code, etc.).

1. Contractor shall design/provide/install lighting controls (i.e. occupancy sensors, lighting relay control panels, photocells, etc.) as required to comply with the Michigan Energy Code.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.

B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

C. Receive, handle, and store wood poles in accordance with ANSI O5.1.

1.06 COORDINATION

A. Furnish bolt templates and pole mounting accessories to installer of pole foundations.

1.07 SUBSTITUTION ITEMS REQUIRING PRIOR APPROVAL

A. All items that the CONTRACTOR proposes to use in the work, that are not specifically named in the contract documents, must be submitted for review/approval. Such items must be submitted in duplicate to the ARCHITECT and/or ENGINEER for approval a minimum of ten (10) days prior to bid opening. Requests for prior approval must be accompanied by complete catalog information, including but not limited to, model, size, accessories, complete electrical information and performance data in the form given in the equipment schedule on the drawings at stated design conditions. Where items are referred to by symbolic designations on the drawings, all requests for prior approval shall bear the same designations.

B. Lighting Substitutions:

1. Furnish lighting fixtures as scheduled on drawings.

2. Lighting fixture substitutions may be considered for approval by the ARCHITECT/ENGINEER only if all of the following criteria are met:

a. Provide specification cut sheets marked-up to clearly identify the proposed luminaire including features, options, accessories, etc. required to match products indicated in the schedules.

b. Submit all cut sheets, etc. to the ARCHITECT/ENGINEER no less than 10 days prior to bid date. Substitutions submitted after this date will not be considered.

1.08 EXTRA MATERIALS

A. Furnish two of each type and wattage lamp installed.

B. Furnish two of each ballast type.

C. Furnish two gallons of touch-up paint.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Cooper Lighting Group.

B. Lithonia.

C. Hubbell Lighting Group Products.

D. Or as noted in lighting schedule on the drawings.

2.02 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the Drawings.

2.03 LUMINAIRES

A. Provide products that comply with requirements of NFPA 70.

B. Provide products that are listed and labeled as complying with UL 1598, where applicable.

C. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

D. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

E. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.

F. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

2.04 BALLASTS

A. All Ballasts:

1. Provide ballasts containing no polychlorinated biphenyls (PCBs).

2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.

B. Fluorescent Ballasts: ANSI C82.1, high power factor type electromagnetic ballast, suitable for lamps specified.

1. Provide low-temperature ballast suitable for lamps specified.

2. Voltage: Match luminaire voltage.

3. Certify fluorescent ballast design and construction by Certified Ballast Manufacturers, Inc.

C. High Intensity Discharge (HID) Ballasts: ANSI C82.4, metal halide or high pressure sodium lamp ballast, suitable for lamp specified.

1. Voltage: Match luminaire voltage.

2. Manufacturers:

a. Advance.

b. Magnetic-Universal.

c. Valmount-Electric.

2.05 LAMPS

A. Manufacturers:

1. GE Lighting: www.gelighting.com.

2. Philips Lighting Co of NA: www.lighting.philips.com.

3. Osram Sylvania.

B. All Lamps:

1. Unless explicitly excluded, provide new, compatible, operable lamps in each luminaire.

2. Verify compatibility of specified lamps with luminaires to be installed. Where lamps are not specified, provide lamps per luminaire manufacturer's recommendations.

3. Minimum Efficiency: Provide lamps complying with all current applicable federal and state lamp efficiency standards.

4. Color Temperature Consistency: Unless otherwise indicated, for each type of lamp furnish products which are consistent in perceived color temperature. Replace lamps that are determined by the ENGINEER to be inconsistent in perceived color temperature.

C. Lamp Types: As specified for each luminaire.

1. Note: All lamps for exterior lighting operating at more than 100 watts shall have lamps with a minimum efficacy of 60 lm/W.

PART 3 EXECUTION

3.01 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 0537 as required for installation of luminaires provided under this section.

B. Install products according to manufacturer's instructions.

C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship) and NECA/IESNA 501 (exterior lighting).

D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

E. Install accessories furnished with each luminaire.

F. Bond products and metal accessories to branch circuit equipment grounding conductor.

G. Provide concrete bases for lighting poles at locations indicated, in accordance with Section 03 3000.

H. Install lamps in each luminaire.

I. All night lights, emergency lights, and exit signs shall be circuited from the unswitched hot leg of the general lighting circuit for the area served by the night/emergency/exit lights.

J. Coordinate location of remote test switch/charge light with architect prior to rough-in.

K. Remote mount battery packs for emergency ballasts in ceiling spaces above heated areas for outdoor emergency fixtures.

3.02 FIELD QUALITY CONTROL

A. Inspect each product for damage and defects.

B. Operate each luminaire after installation and connection to verify proper operation.

C. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by ENGINEER.

D. Measure illumination levels to verify conformance with performance requirements. Take measurements during night sky, without moon or with heavy overcast clouds effectively obscuring moon.

3.03 ADJUSTING

A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by ENGINEER. Secure locking fittings in place.

B. Aim and adjust luminaires to provide illumination levels and distribution as directed.

3.04 SCHEDULE - See Drawings

END OF SECTION

SECTION 28 3100

FIRE DETECTION AND ALARM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire alarm system design and installation, including all components, wiring, and conduit.

B. Maintenance of fire alarm system under contract for specified warranty period.

1.02 REFERENCE STANDARDS

A. IEEE C62.41.2 - Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and Less) AC Power Circuits

B. IEEE C62.41 - IEEE Recommended Practice on Surge Voltages in Low-Voltage Power Circuits.

C. NFPA 70 - National Electrical Code.

D. NFPA 72 - National Fire Alarm Code and Signaling Code.

E. NFPA 101 - Code for Safety to Life from Fire in Buildings and Structures.

F. Applicable Building Code.

1.03 SUBMITTALS

A. Drawings must be prepared as .DWG-format CAD drawings.

1. OWNER will provide floor plan drawings for CONTRACTOR's use; verify all dimensions on OWNER-provided drawings.

B. Design Documents: Submit all information required for plan review and permitting by authorities having jurisdiction, including but not limited to floor plans, riser diagrams, and description of operation:

1. Copy (if any) of list of data required by authority having jurisdiction.
2. Location of all components, circuits, and raceways; mark components with identifiers used in control unit programming.
3. Circuit layouts; number, size, and type of raceways and conductors; conduit fill calculations; spare capacity calculations; notification appliance circuit voltage drop calculations.
4. List of all devices on each signaling line circuit, with spare capacity indicated.
5. Manufacturer's detailed data sheet for each component, including wiring diagrams, installation instructions, and circuit length limitations.
6. Description of power supplies; if secondary power is by battery include calculations demonstrating adequate battery power.

C. Inspection and Test Reports:

1. Submit inspection and test plan prior to closeout demonstration.
2. Submit documentation of satisfactory inspections and tests.
3. Submit NFPA 72 "Inspection and Test Form," filled out.

D. Operating and Maintenance Data: Revise and resubmit until acceptable; have one set available during closeout demonstration:

1. Original copy of NFPA 72 with portions that are not relevant to this project neatly crossed out

by hand; label with project name and date.

2. Complete set of specified design documents, as approved by authority having jurisdiction.
3. Additional printed set of project record documents and closeout documents, bound or filed in same manuals.
4. Contact information for firm that will be providing contract maintenance and trouble call-back service.
5. List of recommended spare parts, tools, and instruments for testing.
6. Detailed troubleshooting guide and large scale input/output matrix.
7. Detailed but easy to read explanation of procedures to be taken by non-technical administrative personnel in the event of system trouble, when routine testing is being conducted, for fire drills, and when entering into contracts for remodeling.

E. Project Record Documents: Have one set available during closeout demonstration:

1. Complete set of floor plans showing actual installed locations of components, conduit, and zones.
2. "As installed" wiring and schematic diagrams, with final terminal identifications.
3. "As programmed" operating sequences, including control events by device, updated input/output chart, and voice messages by event.

F. Closeout Documents:

1. NFPA 72 "Record of Completion", filled out completely and signed by installer and authorized representative of authority having jurisdiction.
2. Certificate of Occupancy.

1.04 QUALITY ASSURANCE

A. Copies of Design Criteria Documents: Maintain at the project site for the duration of the project, bound together, an original copy of NFPA 72, the relevant portions of applicable codes, and instructions and guidelines of authorities having jurisdiction; deliver to OWNER upon completion.

B. Designer Qualifications: NICET Level III or IV (3 or 4) certified fire alarm technician or registered fire protection engineer, employed by fire alarm control panel manufacturer, CONTRACTOR, or installer, with experience designing fire alarm systems in the jurisdictional area of the authorities having jurisdiction.

C. Installer Qualifications: Firm with minimum 5 YEARS documented experience installing fire alarm systems of the specified type and providing contract maintenance service as a regular part of their business.

1. Authorized representative of control unit manufacturer; submit manufacturer's certification that installer is authorized; include name and title of manufacturer's representative making certification.

1.05 WARRANTY

A. Provide control panel manufacturer's warranty that system components other than wire and conduit are free from defects and will remain so for 1 year after date of Substantial Completion.

B. Provide installer's warranty that the installation is free from defects and will remain so for 1 year after date of Substantial Completion.

1.06 GENERAL REQUIREMENTS

A. Refer to 260001 - General Electrical Requirements for general requirements of this specification section.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire Alarm Control Units - Provided their products meet or exceed the performance of the basis of design product, products of the following are acceptable:

1. Honeywell Security & Fire Solutions/Notifier: www.notifier.com.
2. SimplexGrinnell: www.simplexgrinnell.com.
3. Edwards System Technology.
4. Provide all control units made by the same manufacturer.

B. Initiating Devices, and Notification Appliances:

1. Same manufacturer as control units.
2. Provide all initiating devices and notification appliances made by the same manufacturer.

2.02 FIRE ALARM SYSTEM

A. Fire Alarm System: Provide a new automatic fire detection and alarm system:

1. Provide design and installation of all components/wiring/conduit/etc. necessary to provide a complete/functional system per NFPA 72. The contract documents are diagrammatical in nature and should not be used or bid as detailed design drawings. The fire alarm contractor shall provide any/all design and construction required for the entire fire alarm system and bid the project as such.
2. Protected Premises: Entire building shown on drawings.
3. Comply with the following; where requirements conflict, order of precedence of requirements is as listed:
   a. The Americans With Disabilities Act (ADA).
   b. The requirements of the State Fire Marshal.
   c. The requirements of the local authority having jurisdiction.
   d. Applicable local codes.
   e. The contract documents (drawings and specifications).
   f. NFPA 101.
   g. NFPA 72; where the word "should" is used consider that provision mandatory; where conflicts between requirements require deviation from NFPA 72, identify deviations clearly on design documents.
4. Evacuation Alarm: Multiple smoke zones; allow for evacuation notification of any individual zone or combination of zones, in addition to general evacuation of entire premises.
5. Fire Command Center: Location indicated on drawings.
6. Master Control Unit (Panel): New, located at fire command center.
7. Combined Systems: Do not combine fire alarm system with other non-fire systems.
8. The fire alarm designer/installer shall visit the site to familiarize himself with the project's existing conditions and determine the full extent and character of his work.

B. Circuits:

1. Initiating Device Circuits (IDC): Class B, Style C.
2. Signaling Line Circuits (SLC) Within Single Building: Class B, Style 4.

3. Notification Appliance Circuits (NAC): Class B, Style Y.
4. All circuits shall be installed in conduit.

C. Spare Capacity:

1. Initiating Device Circuits: Minimum 25 percent spare capacity.
2. Notification Appliance Circuits: Minimum 25 percent spare capacity.
3. Speaker Amplifiers: Minimum 25 percent spare capacity.
4. Master Control Unit: Capable of handling all circuits utilized to capacity without requiring additional components other than plug-in control modules.

D. Power Sources:

1. Primary: Dedicated branch circuits of the facility power distribution system.
2. Secondary: Storage batteries.
3. Capacity: Sufficient to operate entire system for period specified by NFPA 72.
4. Each Computer System: Provide uninterruptible power supply (UPS).

2.03 FIRE SAFETY SYSTEMS INTERFACES

A. Alarm: Provide alarm initiation in accordance with NFPA 72 for the following:

1. Smoke/Heat detectors.
2. Pull stations.

2.05 COMPONENTS

A. General:

1. Provide flush mounted units where installed in finish areas; in unfinished areas, surface mounted unit are acceptable.
   a. Provide matching shrouds to cover sides of new devices that are installed on surface mounted J-boxes.
2. Provide legible, permanent labels for each control device, using identification used in operation and maintenance data.
3. Drawings are diagrammatic and indicate the general scope of work. Provide design and installation of all initiating devices, notification appliances, circuits, etc. required for a complete/functional system per NFPA 72, Life Safety Code, and applicable building codes, whether accurately shown on the drawings or not.

B. Fire Alarm Control Units, Initiating Devices, and Notification Appliances: Addressable Type; listed by Underwriters Laboratories as suitable for the purpose intended.

C. Initiating Devices:

1. Manual Pull Stations:
   a. Provide 1 extra.
2. Smoke Detectors:
   a. Provide 1 extra.
3. Heat Detectors:
   a. Provide 1 extra.
4. Addressable Interface Devices:

D. Notification Appliances:

1. Horn/Strobes: All horn/strobes shall have field adjustable candela options of 15, 30, 75, 95, and 110 candela.

a. Provide 1 extra.

2. Strobes: _All strobes shall have field adjustable candela options of 15, 30, 75, 95, and 110 candela.

a. Provide 1 extra.

E. Circuit Conductors: Copper or optical fiber; provide 200 feet (60 m) extra; color code and label.

F. Provide protective guards for all notification appliances and initiating devices located in high abuse areas (i.e. gymnasiums, locker rooms, mechanical rooms, etc.).

G. Provide weatherproof devices in wet/damp locations (i.e. outdoors, shower rooms, locker rooms, pool/spa areas, etc.)

H. Surge Protection: In accordance with IEEE C62.41.2 category B combination waveform and NFPA 70; except for optical fiber conductors.

1. Equipment Connected to Alternating Current Circuits: Maximum let through voltage of 350 V(ac), line-to-neutral, and 350 V(ac), line-to-line; do not use fuses.

I. Locks and Keys: Deliver keys to OWNER.

1. Provide the same standard lock and key for each key operated switch and lockable panel and cabinet; provide 5 keys of each type

J. Instruction Charts: Printed instruction chart for operators, showing steps to be taken when a signal is received (normal, alarm, supervisory, and trouble); easily readable from normal operator's station.

1. Frame: Stainless steel or aluminum with polycarbonate or glass cover.

2. Provide one for each control unit where operations are to be performed.

3. Obtain approval of OWNER prior to mounting; mount in location acceptable to OWNER.

4. Provide extra copy with operation and maintenance data submittal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with applicable codes, NFPA 72, NFPA 70, and the contract documents.

B. Conceal all wiring, conduit, boxes, and supports where installed in finished areas.

C. Obtain OWNER's approval of locations of devices, before installation.

D. Install instruction cards and labels.

3.02 INSPECTION AND TESTING FOR COMPLETION

A. Notify OWNER 7 days prior to beginning completion inspections and tests.

B. Notify authorities having jurisdiction and comply with their requirements for scheduling inspections and tests and for observation by their personnel.

C. Provide the services of the installer's supervisor or person with equivalent qualifications to supervise inspection and testing, correction, and adjustments.

D. Prepare for testing by ensuring that all work is complete and correct; perform preliminary tests as required.

E. Provide all tools, software, and supplies required to accomplish inspection and testing.

F. Perform inspection and testing in accordance with NFPA 72 and requirements of local authorities; document each inspection and test.

G. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.

3.03 OWNER PERSONNEL INSTRUCTION

A. Provide the following instruction to designated OWNER personnel:

1. Hands-On Instruction: On-site, using operational system.

B. Basic Operation: One-hour sessions for attendant personnel, security officers, and engineering staff; combination of classroom and hands-on:

1. Initial Training: 1 session pre-closeout.
2. Refresher Training: 1 session post-occupancy.

C. Furnish the services of instructors and teaching aids; have copies of operation and maintenance data available during instruction.

3.04 CLOSEOUT

A. Closeout Demonstration: Demonstrate proper operation of all functions to OWNER.

1. Be prepared to conduct any of the required tests.
2. Have at least one copy of operation and maintenance data, preliminary copy of project record drawings, input/output matrix, and operator instruction chart(s) available during demonstration.
3. Have authorized technical representative of control unit manufacturer present during demonstration.
4. Demonstration may be combined with inspection and testing required by authority having jurisdiction; notify authority having jurisdiction in time to schedule demonstration.
5. Repeat demonstration until successful.

B. Substantial Completion of the project cannot be achieved until inspection and testing is successful and:

1. Approved operating and maintenance data has been delivered.
2. All aspects of operation have been demonstrated to OWNER.
3. Final acceptance of the fire alarm system has been given by authorities having jurisdiction.
4. Occupancy permit has been granted.
5. Specified pre-closeout instruction is complete.

C. Perform post-occupancy instruction within 3 months after Substantial Completion.

3.05 MAINTENANCE

A. Provide to OWNER, maintenance service for 1 year, to include the work described below.

B. Perform routine inspection, testing, and preventive maintenance required by NFPA 72, including:

1. Maintenance of fire safety interface and supervisory devices connected to fire alarm system.
2. Repairs required, unless due to improper use, accidents, or negligence beyond the control of the maintenance contractor.
3. Record keeping required by NFPA 72 and authorities having jurisdiction.

C. Provide trouble call-back service upon notification by OWNER:

1. Provide on-site response within 8 hours of notification.
2. Include allowance for call-back service during normal working hours at no extra cost to OWNER.
3. OWNER will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.

D. Provide a complete description of preventive maintenance, systematic examination, adjustment, cleaning, inspection, and testing, with a detailed schedule.

E. Maintain a log at each fire alarm control unit, listing the date and time of each inspection and call-back visit, the condition of the system, nature of the trouble, correction performed, and parts replaced. Submit duplicate of each log entry to OWNER's representative upon completion of site visit.

F. Comply with OWNER's requirements for access to facility and security.

END OF SECTION

SECTION 32 13 13

CONCRETE PAVING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Aggregate base course.
2. Concrete paving for Concrete sidewalks.

B. Related Requirements:
1. Section 07 90 00 - Joint Protection: Sealant for joints.

1.2 REFERENCE STANDARDS

A. American Concrete Institute:
1. ACI 301 - Specifications for Structural Concrete.

B. ASTM International:
1. ASTM A185/A185M - Standard Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
2. ASTM C33 - Standard Specification for Concrete Aggregates.
3. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete.
4. ASTM C150 - Standard Specification for Portland Cement.
5. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
6. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
7. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete.
8. ASTM C595 - Standard Specification for Blended Hydraulic Cements.
9. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.
10. ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.
11. ASTM C1017/C1017M - Standard Specification for Chemical Admixtures for Use in Producing Flowing Concrete.
12. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).
13. ASTM D2922 – Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
14. ASTM D3017 – Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Product Data:
1. Submit data on concrete materials, joint filler, admixtures, curing compounds.

C. Design Data:

1. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:
   a. Hot and cold weather concrete work.
2. Identify mix ingredients and proportions, including admixtures.
3. Identify chloride content of admixtures and whether or not chloride was added during manufacture.

D. Source Quality Control Submittals: Indicate results of [shop] [factory] tests and inspections.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301.

B. Obtain cementitious materials from same source throughout.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years experience.

B. Installer: Company specializing in performing work of this section.

1.6 AMBIENT CONDITIONS

A. Section 01 50 00 - Temporary Facilities and Controls: Ambient conditions control facilities for product storage and installation.

B. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 PRODUCTS

2.1 AGGREGATE BASE COURSE

A. Aggregate Base Course: MDOT Class II Fine aggregate sand; Natural river or bank run sand, washed, free of silt, clay, loam, friable or soluble materials, and organic matter.

2.2 CONCRETE PAVING

A. Form Materials:
   1. Wood or steel form material, profiled to suit conditions.
   2. Joint Filler: ASTM D1751; Asphalt impregnated fiberboard or felt, 1/4 inch thick.

B. Reinforcement:
   1. Welded Plain Wire Fabric: ASTM A185/A185M; in flat sheets; unfinished.
   2. Tie Wire: Minimum 16 gage annealed type.

C. Concrete Materials:
   1. Cement: ASTM C150, Type IA - Air Entraining Portland type; gray color.
   2. Fine Aggregates: ASTM C33; 2NS gradation.
   3. Coarse Aggregates: ASTM C33, 6A or 6AA gradation.
   4. Water: ASTM C94/C94M; potable, without deleterious amounts of chloride ions.

5. Air Entrainment: ASTM C260.
6. Chemical Admixture: ASTM C494/C494M.
7. Fly Ash: ASTM C618, Type F.
8. Slag: ASTM C989; Grade 100; ground granulated blast furnace slag.
9. Plasticizing: ASTM C1017/C1017M Type I, plasticizing.

2.3 MIXES

A. Concrete Mix - By Performance Criteria:
   1. Mix and deliver concrete in accordance with ASTM C94/C94M, Option A.
   2. Select proportions for normal weight concrete in accordance with ACI 301 Method 1 or Method 2.
   3. Provide concrete to the following criteria:
      a. Compressive Strength: 3,500 psi at 28 days.
      b. Slump: 4 inches, plus or minus 1 inch.
      c. Minimum Cement Content: 564 pounds/cu yd.
      d. Maximum Water/Cement Ratio: 0.45.
      e. Air Entrainment:
         1) 6 percent, plus or minus 1.5 percent at point of delivery for 1-inch nominal maximum aggregate size.
   4. Limit the following cementitious materials to maximum percentage by mass of all cementitious materials:
      a. Fly Ash: 20 percent.
      b. Blast Furnace Slag: 40 percent.
      c. Fly Ash and Blast Furnace Slag: 40 percent.
   5. Use accelerating admixtures in cold weather only when approved by the Architect/Engineer in writing. Use of admixtures will not relax cold weather placement requirements.
   6. Use of calcium chloride is prohibited.
   7. Use set retarding admixtures during hot weather only when approved by the Architect/Engineer in writing.

2.4 ACCESSORIES

A. Curing Compound: ASTM C309, Type 1, Class A.

2.5 SOURCE QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Testing and Inspection Services: Provide mix design for concrete.

B. Submit proposed mix design to appointed firm for review prior to commencement of Work.

C. Tests on cement, aggregates, and mixes will be performed to ensure conformance with specified requirements.

D. Test samples in accordance with ACI 301.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation examination.

B. Verify compacted granular subbase is dry and ready to support paving and imposed loads.
   1. Proof roll subbase with in minimum two perpendicular passes to identify soft spots.
   2. Remove soft subbase and replace with compacted base.

C. Verify gradients and elevations of base are correct.

3.2 PREPARATION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for installation preparation.

B. Moisten substrate to minimize absorption of water from fresh concrete.

C. Coat surfaces of manhole or catch basin frames with oil to prevent bond with concrete paving.

D. Notify Architect/Engineer minimum 24 hours prior to commencement of concreting operations.

3.3 INSTALLATION

A. Aggregate Base Course:
   1. Spread aggregate over prepared substrate to a total compacted thickness of 6 inches.
   2. Place aggregate in maximum 6 inch layers and vibratory compact to specified density.
   3. Level and contour surfaces to elevations and gradients indicated.
   4. Add water to assist compaction up to optimum moisture content measured in accordance with ASTM D3017. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
   5. Use mechanical tamping equipment in areas inaccessible to compaction equipment.
   6. Compact aggregate to 98% maximum dry density measured as provided in ASTM D2922.

B. Forms:
   1. Place and secure forms and screeds to correct location, dimension, profile, and gradient.
   2. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Reinforcement:
   1. Place reinforcing at mid-height of paving.
   2. Interrupt reinforcing at expansion joints.
   3. Place dowels to achieve paving and curb alignment as detailed.

D. Placing Concrete:
   1. Place concrete in accordance with ACI 301.
   2. Ensure reinforcing, inserts, embedded parts, and formed joints are not disturbed during concrete placement.
   3. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.
   4. Place concrete to joint pattern indicated.

E. Joints
   1. Place expansion joints at 15 foot intervals. Align curb, gutter, and sidewalk joints.
   2. Place joint filler between paving components and building or other appurtenances.
   3. Provide scored or sawn joints at 5 feet intervals.

F. Finishing:
   1. Sidewalk Paving: Light broom, radius to 1/2 inch radius, and trowel joint edges.

G. Curing and Protection
   1. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
   2. Install curing compound in accordance with manufacturer's instructions.
   3. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.4 TOLERANCES

A. Section 01 40 00 - Quality Requirements: Tolerances.

B. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.

C. Maximum Variation From True Position: 1/4 inch.

3.5 PROTECTION

A. Section 01 70 00 - Execution and Closeout Requirements: Requirements for protecting finished Work.

B. Immediately after placement, protect paving from premature drying, excessive hot or cold temperatures, and mechanical injury.

C. Do not permit pedestrian traffic over paving for 7 days minimum after finishing. Prohibit vehicular traffic on sidewalks.

END OF SECTION