

RFB NO. 313072



CONSTRUCTION DOCUMENTS PROJECT MANUAL

DANE COUNTY DEPARTMENT OF PUBLIC WORKS,
HIGHWAY AND TRANSPORTATION

PUBLIC WORKS ENGINEERING DIVISION
1919 ALLIANT ENERGY CENTER WAY
MADISON, WISCONSIN 53713

REBID REQUEST FOR BIDS NO. 313072 ALLIANT ENERGY CENTER PAVILIONS ALLIANT ENERGY CENTER 1919 ALLIANT ENERGY CENTER WAY MADISON, WISCONSIN

OCTOBER 29, 2013

VOLUME 1 OF 2

Due Date / Time: **THURSDAY, NOVEMBER 21, 2013 / 2:00 P.M.**

Location: **PUBLIC WORKS OFFICE**

Performance / Payment Bond: **100% OF CONTRACT AMOUNT**

Bid Deposit: **5% OF BID AMOUNT**

FOR INFORMATION ON THIS REQUEST FOR BIDS, PLEASE CONTACT:

ROB NEBEL, ASSISTANT DIRECTOR OF PUBLIC WORKS
TELEPHONE NO.: 608/267-0119
FAX NO.: 608/267-1533
E-MAIL: NEBEL@COUNTYOFDANE.COM

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LEGAL NOTICE

INVITATION TO BID

Dane County Public Works, Highway & Transportation Dept., 1919 Alliant Energy Center Way, Madison, WI 53713, will receive sealed Bids until:

2:00 P.M., THURSDAY, NOVEMBER 21, 2013

REQUEST FOR BIDS NO. 313072

REBID

ALLIANT ENERGY CENTER ALLIANT ENERGY CENTER PAVILIONS 1919 ALLIANT ENERGY CENTER WAY MADISON, WISCONSIN

Dane County is inviting Bids for construction services for the new Alliant Energy Center Pavilions to include demolition of 12 barn structures, site development, and construction of two Pavilion buildings. Pavilion 1 will include a 2-story Prefunction conventional structure, while the remainder of the facility will feature pre-engineered metal frame construction. Pavilion 1 will be heated and is approximately 90,000 square feet in size. Pavilion 2 will feature pre-engineered metal frame construction and will be approximately 200,000 square feet in size. There will be a shed roofed metal frame building on one end of Pavilion 2 that will serve as a maintenance facility. The entire project from demolition to substantial completion must occur between April 14, 2014 and September 19, 2014 to allow the Midwest Horse Fair and the World Dairy Expo to hold and prepare for their respective events. Firms with capabilities, experience & expertise with similar projects should request this packet & submit Bids.

Request for Bids package will be available on Tuesday, October 29, 2013 (after 2 PM) and may be downloaded from the Dane County Public Works, Highway & Transportation Department website at www.countyofdane.com/pwbids. Please call Eric Urtes, AIA, Project Manager, at 608/266-4798, for any questions or additional information.

All Bidders must be a registered vendor with Dane County & pay an annual registration fee & must be pre-qualified as a Best Value Contractor before award of Contract. Complete Vendor Registration Form at www.danepurchasing.com/registration or obtain one by calling 608/266-4131. Complete Pre-qualification Application for Contractors at www.countyofdane.com/pwht/BVC_Application.aspx or obtain one by calling 608/266-4018.

Bidders site tour will be held on Tuesday, November 12, 2013, at 10:00 AM, starting in the main conference room at 1919 Alliant Energy Center Way. Bidders are strongly encouraged to attend this tour in order to bid on the Work.

**PUBLISH: OCTOBER 24 & OCTOBER 31 2013 - WISCONSIN STATE JOURNAL
 OCTOBER 24 & OCTOBER 31, 2013 - THE DAILY REPORTER**

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1. GENERAL

- A. Before submitting Bid, bidder shall thoroughly examine all Construction Documents. Successful Bidder shall be required to provide all the Work that is shown on Drawings, set forth in Specifications, or reasonably implied as necessary to complete Contract for this project.
- B. Bidder shall visit site to become acquainted with adjacent areas, means of approach to site, conditions of actual site and facilities for delivering, storing, placing, and handling of materials and equipment.
- C. Pre-bid meeting and site tour is scheduled on Tuesday, November 12, 2013 at 10:00 AM at 1919 Alliant Energy Center Way, in the main conference room. Attendance by all bidders is optional, however bidders and subcontractors are strongly encouraged to attend.
- D. Failure to visit site or failure to examine any and all Construction Documents will in no way relieve successful Bidder from necessity of furnishing any necessary materials or equipment, or performing any work, that may be required to complete the Work in accordance with Drawings and Specifications. Neglect of above requirements will not be accepted as reason for delay in the Work or additional compensation.

2. DRAWINGS AND SPECIFICATIONS

- A. Drawings and Specifications that form part of this Contract, as stated in Article 1 of General Conditions of Contract, are enumerated in Document Index of these Construction Documents.
- B. Complete sets of Drawings and Specifications for all trades will be issued to all Bidders, irrespective of category of work to be bid on, in order that all Bidders may be familiar with work of other trades as they affect their bid.
- C. Request for Bids package (Construction Documents) may be downloaded from the Dane County Public Works, Highway & Transportation Department website at www.countyofdane.com/pwbids.

3. INTERPRETATION

- A. No verbal explanation or instructions will be given in regard to meaning of Drawings or Specifications before Bid Due Date. Bidders shall bring inadequacies, omissions or conflicts to County or Architect / Engineer's attention at least ten (10) days before Bid Due Date. Prompt clarification will be available to all bidders by Addendum.
- B. Failure to request clarification or interpretation of Drawings and Specifications will not relieve successful Bidder of responsibility. Signing of Contract will be considered as implicitly denoting that Contractor has thorough understanding of scope of the Work and comprehension of Construction Documents.
- C. County or Architect / Engineer will not be responsible for verbal instructions.
- D. All requests for information and inquiries about the meaning of Drawings and Specifications, and request for product approval, shall be submitted in writing. Bidders may submit via email to all the following addresses simultaneously: volkening@strang-inc.com; rgilbertsen@strang-inc.com; Urtres.Eric@countyofdane.com. Bidders may submit via facsimile to the following telephone number: 608-276-9204, attention Dale Volkening.

4. QUALIFICATIONS OF BIDDER (CONTRACTOR AND SUBCONTRACTOR)

- A. Before award of Contract can be approved, County shall be satisfied that Bidder involved meets following requirements:
 - 1. Has completed at least one (1) project of at least fifty percent (50%) of size or value of Division of work being bid and type of work completed is similar to that being bid. If greater magnitude of experience is deemed necessary, other than size or value of work, such requirements will be described in appropriate section of Specifications.
 - 2. Maintains permanent place of business.
 - 3. Can be bonded for terms of proposed Contract.
 - 4. Has record of satisfactorily completing past projects and supplies list of five (5) most recent, similar projects, with architect or engineer's and County's names, addresses and telephone numbers for each project. Submit to Public Works Project Engineer within

twenty-four (24) hours after Bid Opening. Criteria which will be considered in determining satisfactory completion of projects by bidder will include:

- a) Completed contracts in accordance with drawings and specifications.
 - b) Diligently pursued execution of work and completed contracts according to established time schedule unless County grants extensions.
 - c) Fulfilled guarantee requirements of Construction Documents.
 - d) Is not presently on ineligible list maintained by County's Department of Administration for noncompliance with equal employment opportunities and affirmative action requirements.
 - e) Authorized to conduct business in Wisconsin. By submitting Bid, bidder warrants that it has: complied with all necessary requirements to do business in State of Wisconsin; that persons executing contract on its behalf are authorized to do so; and, if corporation, that name and address of bidder's registered agent are as set forth in Contract. Bidder shall notify County immediately, in writing, of any change in its registered agent, their address, and bidder's legal status. For partnership, term "registered agent" shall mean general partner.
- B. County's Public Works Project Engineer will make such investigations as are deemed necessary to determine ability of bidder to perform the Work, and bidder shall furnish to County's Public Works Project Engineer or designee all such information and data for this purpose as County's Public Works Project Engineer may request. County reserves right to reject Bid if evidence submitted by, or investigation of, bidder fails to satisfy County that bidder is responsible and qualified to carry out obligations of Contract and to complete the Work contemplated therein.

5. BID GUARANTEE

- A. Bank certified check, cashier's check or Bid Bond, payable to County in amount not less than five percent (5%) of maximum bid, shall accompany each Bid as guarantee that if Bid is accepted, Bidder will execute and return proposed Contract and Performance and Payment Bonds within ten (10) days after being notified of acceptance of Bid. Company issuing bonds must be licensed to do business in Wisconsin.
- B. Any bid, which is not accompanied by bid guarantee, will be considered "No Bid" and will not be read at Bid Due Date.
- C. If successful Bidder so delivers Contract, Certificate of Insurance, and Performance and Payment Bonds, check will be returned to Bidder. In case Bidder fails to deliver such Contract, insurance, and bond, amount of bid guarantee will be forfeited to County as liquidated damages.
- D. All checks tendered as bid guarantee, except those of three lowest qualified, responsible bidders, will be returned to their makers within three (3) days after Bid Due Date. All such retained checks will be returned immediately upon signing of Contract and Performance and Payment Bonds by successful Bidder.

6. WITHDRAWAL OF BIDS

- A. Bids may be withdrawn by written request received from bidder or authorized representative thereof prior to time fixed for Bid Due Date, without prejudice to right of bidder to file new Bid. Withdrawn Bids will be returned unopened. Negligence on part of bidder in preparing their Bid confers no right for withdrawal of Bid after it has been opened.

- B. No Bid may be withdrawn for period of sixty (60) days after Bid Due Date.
- C. If Bid contains error, omission or mistake, bidder may limit liability to amount of bidder's guarantee by giving written Notice of Intent not to execute Contract to County within seventy-two (72) hours of Bid Due Date.

7. CONTRACT FORM

- A. Sample copy of contract that successful Bidder will be required to enter into is included in these Construction Documents and bidders are required to familiarize themselves with all conditions contained therein.

8. CONTRACT INTERESTS BY COUNTY PUBLIC OFFICIALS

- A. In accordance with Wisconsin Statute 946.13, county official may not bid for or enter into any contract involving receipts or disbursements of more than \$15,000.00 in a year, in which they have private pecuniary interest, direct or indirect if at same time they are authorized to take official action with respect to making of this Contract. Any contract entered into in violation of this Statute is void and County incurs no liability thereon. This subsection does not affect application and enforcement of Wisconsin Statute 946.13 by state prosecutors in criminal courts of this state.

9. EMERGING SMALL BUSINESS PROVISIONS

- A. **Emerging Small Business Definition.** For purposes of this provision, ESB is defined as:
 - 1. Independent business concern that has been in business minimum of one year;
 - 2. Business located in State of Wisconsin;
 - 3. Business comprised of less than 25 employees;
 - 4. Business must not have gross sales in excess of three million dollars (\$3,000,000.00) over past three years; and
 - 5. Business does not have history of failing to complete projects.
- B. **Emerging Small Business (ESB) Involvement.** Bidder shall make good faith effort to award minimum of ten percent (10%) of the Work to ESBs. Bidder shall submit report to Dane County Contract Compliance Officer within ten (10) days after Bid Due Date demonstrating such efforts. Good faith efforts means significant contact with ESBs for purposes of soliciting bids from them. Failure to make or demonstrate good faith efforts will be grounds for disqualification.
- C. **Emerging Small Business Report.** Emerging Small Business Enterprise Report is to be submitted by Bidder in separate envelope marked "Emerging Small Business Report". This report is due by 2:00 p.m. following specified ten (10) days after Bid Due Date. Bidder who fails to submit Emerging Small Business Report shall be deemed not responsive.
- D. **ESB Goal.** Goal of this project is ten percent (10%) ESB participation. ESB utilizations are shown as percentage of total Bid. If Bidder meets or exceeds specified goal, Bidder is only required to submit Form A - Certification, and Form B - Involvement. Goal shall be met if Bidder qualifies as ESB.

- E. **Report Contents.** Following award of Contract, Bidder shall submit copies of executed contracts for all Emerging Small Businesses. Emerging Small Business Report shall consist of these:
1. Form A - Certification;
 2. Form B - Involvement;
 3. Form C - Contacts;
 4. Form D - Certification Statement (if appropriate); and
 5. Supportive documentation (i.e., copies of correspondence, telephone logs, copies of advertisements).
- F. **ESB Listing.** Bidders will solicit bids from ESB listing provided by Dane County.
- G. **ESB Certification.** All contractors, subcontractors and suppliers seeking ESB certification must complete and submit Emerging Small Business Certification Application to Dane County Contract Compliance Program.
- H. **Certification Statement.** If ESB firm has not been certified by County as ESB prior to submittal of this Bid, ESB Report cannot be used to fulfill ESB goal for this project unless firm provides "Form D - Certification Statement". Certification statement must be completed and signed by ESB firm.
- I. **Questions.** Questions concerning Emerging Small Business provisions shall be directed to:
Dane County Contract Compliance Officer
City-County Building, Room 421
210 Martin Luther King, Jr. Blvd.
Madison, WI 53703
608/266-5623
- J. **Substituting ESBs.** In event of any significant changes in subcontract arrangements or if need arises to substitute ESBs, Bidder shall report such proposed changes to Contract Compliance Officer to making any official changes and request authorization to substitute ESB firm. Bidder further agrees to make every possible effort to replace ESB firm with another qualified ESB firm.
- K. **Good Faith Efforts.** Good faith efforts can be demonstrated by meeting all of these obligations:
1. Selecting portions of the Work to be performed by ESBs in order to increase likelihood of meeting ESB goal including, where appropriate, breaking down Contract into smaller units to facilitate ESB participation.
 2. Advertising in general circulation, trade associations and women / minority focus media concerning subcontracting opportunities.
 3. Providing written notices to reasonable number of specific ESBs that their interest in Contract was being solicited in sufficient time to allow ESBs to participate effectively.
 4. Following up on initial solicitations of interest by contacting ESBs within five (5) working days prior to Bid Due Date to determine with certainty whether ESB were interested, to allow ESBs to prepare bids.

5. Providing interested ESB with adequate information about Drawings, Specifications and requirements of Contract.
 6. Using services of available minority, women and small business organizations and other organizations that provide assistance in recruitment of MBEs / WBEs / ESBs.
 7. Negotiating in good faith with interested ESBs, not rejecting ESBs as unqualified without sound reason based on thorough investigation of their capabilities.
 8. Submitting required project reports and accompanying documents to County's Contract Compliance Officer within ten (10) days after Bid Due Date.
- L. **Appeals Disqualification of Bid.** Bidder who is disqualified may appeal to Public Works & Transportation Committee and Equal Opportunity Commission.

10. METHOD OF AWARD - RESERVATIONS

- A. Following will be basis of award of Contract, providing cost does not exceed amount of funds then estimated by County as available to finance Contract(s):
1. Lowest dollar amount submitted by qualified responsible bidder on Base Bid for all work comprising project, combined with such additive County accepted alternates.
 2. County reserves right to reject all bids or any bid, to waive any informality in any bid, and to accept any bid that will best serve interests of County.
 3. Unit Prices and Informational Bids will not be considered in establishing low bidder.

11. SECURITY FOR PERFORMANCE AND PAYMENTS

- A. Simultaneous with delivery of signed Contract, Bidder shall be required to furnish Performance and Payment Bonds as specified in Article 29 of General Conditions of Contract, "Contract Security". Surety Company shall be licensed to do business in Wisconsin. Performance and Payment Bonds must be dated same date or subsequent to date of Contract. Performance and Payment Bonds must emulate information in Sample Performance and Payment Bonds in Construction Documents.
- B. Provide certified copy of power of attorney from Surety Company showing that agent who signs Bond has power of attorney to sign for Surety Company. Secretary or Assistant Secretary of company must sign this certification, not attorney-in-fact. Certification must bear same or later date as Bond. Power of Attorney must emulate model power of attorney information detailed in Sample Performance and Payment Bonds.
- C. If Bidder is partnership or joint venture, State certified list, providing names of individuals constituting partnership or joint venture must be furnished. Contract itself may be signed by one partner of partnership, or one partner of each firm comprising joint venture, but Performance and Payment Bonds must be signed by all partners.
- D. If Bidder is a corporation, it is necessary that current certified copy of resolution or other official act of directors of corporation be submitted showing that person who signs Contract is authorized to sign contracts for corporation. It is also necessary that corporate seal be affixed to resolution, contract, and performance and payment bonds. If your corporation has

no seal, it is required that above documents include statement or notation to effect that corporation has no seal.

12. TAXES

- A. Bidder shall include in Bid, all Sales, Consumer, Use and other similar taxes required by law.
- B. In accordance with Wisconsin Statute 71.80(16)(a), successful nonresident bidder, whether incorporated or not, and not otherwise regularly engaged in business in this state, shall file surety bond with State of Wisconsin Department of Revenue payable to Department of Revenue, to guarantee payment of income taxes, required unemployment compensation contributions, sales and use taxes and income taxes withheld from wages of employees, together with any penalties and interest thereon. Amount of bond shall be three percent (3%) of Contract or subcontract price on all contracts of \$50,000 or more.

13. SUBMISSION OF BIDS

- A. All Bids shall be submitted on standard Bid Form bound herein and only Bids that are made on this Bid Form will be considered. Entire Bid Form and other supporting documents, if any, shall be removed or copied from Construction Documents, filled out, and submitted in manner specified hereinafter. Submit completed Bid Bond with Bid as well.
- B. No bids for any subdivision or any sub-classification of this Work, except as indicated, will be accepted. Any conditional Bid, amendment to Bid Form or appended item thereto, or inclusion of any correspondence, written or printed matter, or details of any nature other than that specifically called for, which would alter any essential provision of Construction Documents, or require consideration of unsolicited material or data in determining award of Contract, will disqualify Bid. Telecommunication alterations to Bid will not be accepted.
- C. Bidders must submit single Bid for all the Work.
- D. Bid amounts shall be inserted in words and in figures in spaces provided on Bid Form; in case of conflict, written word amounts will govern.
- E. Addenda issued after Bid Letting shall become part of Construction Documents. Bidders shall acknowledge receipt of such addenda in appropriate space provided on Bid Form. Bid may be rejected if receipt of any particular addendum applicable to award of Contract has not been acknowledged on Bid Form.
- F. Bids shall be signed, placed in envelope, sealed and delivered before time of closing to place designated in Invitation to Bid, and identified with project name, bid number, location, category of work being bid upon, Bid Due Date, name and address of bidder.
- G. Bidder shall be responsible for sealed Bid being delivered to place designated for Bid Due Date on or before date and time specified. Bids received after time of closing will be rejected and returned to bidder unopened.
- H. Bid will be considered invalid and will be rejected if bidder has not signed it.
- I. Faxed Bids will not be accepted.
- J. Bidder's organization shall submit completed with Bid, Fair Labor Practices Certification form, included in these Construction Documents.

14. SUBCONTRACTOR LISTING

- A. Bidders shall be required to submit list of major subcontractors for General Construction, Plumbing, HVAC, and Electrical work proposed for this project to include committed prices for each subcontractor. List shall be placed in separate sealed envelope that must be clearly identified as "Major Subcontractor List", for named project and name of Bidder submitting it. County must receive envelope no later than date by which successful Bidder is required to submit his or her signed Contract, as established in Construction Documents.

15. ALTERNATE BIDS

- A. Bidder shall carefully read requests for Alternate Bids, and thoroughly examine Drawings and Specifications to determine extent various changes and conditions will affect Bid.
- B. Space is provided in Bid Form for requested Alternate Bids. Failure to submit bid for any requested Alternate Bids may result in rejection of entire Bid.
- C. Bidder shall state amount to be added / subtracted to Base Bid for providing alternates, including all incidentals, omissions, additions, and adjustments as may be necessary or required by such changes. If there is no difference in price, Bidder shall state, "No Change".
- D. Descriptions of requested Alternate Bids are as set forth in Construction Documents.

16. INFORMATIONAL BIDS

- A. Bidder shall state amount that is included in Base Bid for all equipment, materials and labor required to complete the Work described. Informational bids are amounts requested for accounting purposes and for allocation of funds only. It is not intended to omit any of the Work described or related items from this project.
- B. Description of requested Informational Bids, if any, is as set forth in Construction Documents.

17. UNIT PRICES

- A. Provide unit prices where requested on Bid Form. Unit prices will include all costs for materials, labor, insurance, taxes, overhead and profit necessary to perform specified work. Estimated quantities are approximate only. Payment will be based upon actual quantities placed, provided or installed. Failure to provide requested unit prices may result in rejection of entire Bid.
- B. County reserves right to accept or reject any unit prices as given in Bid.
- C. Bidder shall refer to Bid Form and applicable specification section to determine basis of unit measure and detailed information related to each unit price item requested.

18. COMMENCEMENT AND COMPLETION

- A. Successful Bidder shall commence work when schedule and weather permit, but no later than stated in Bid Form. Contractor shall pursue the Work regularly and continuously at reasonable rate to insure completion of the Work within time stated in Bid.
- B. Should it be found impossible to complete the Work on or before time specified for completion, written request may be submitted for extension of time setting forth reasons believed to justify granting of such request.

19. WORK BY COUNTY

- A. Not Applicable.

20. ALLOWANCE FOR ACTIVE NETWORK EQUIPMENT

- A. A Lump Sum Allowance for a portion of the Information Technology scope will be included in the Base Bid. The Construction Document scope will include fiber and copper backbone cabling, patch panels and support and pathway systems. The Allowance will be used for active network equipment, including switches, wireless access points, and cat 6 horizontal cabling to support access points.

21. ADDITIONAL INFORMATION ON ALTERNATES, UNIT PRICES, INFORMATIONAL BIDS AND ALLOWANCES FOR ITEMS LISTED ON BID FORM

The following is the list for alternate bid, unit pricing, and informational bids included in the project & listed on the Bid Form. Some Alternates on the list are keyed to the associated areas on the Drawings (Area E, & Area F are examples) and should be referred to for determination of the scope of the work. This list will be included in the front end of the specifications and the same identification should be used on the documents to call out the scope of the work.

Alternate Bid items:

- Alternate #1: Add price for providing interior build-out of Family Toilet 134, Janitor 135, Women's Toilet 136, and Men's Toilet 137. This alternate includes all above slab work including but not limited to; plumbing fixtures, CMU wall assemblies, light gage metal ceiling assemblies, interior finishes, specialties, mechanical and electrical equipment. Refer to the drawings for further clarifications.
- Alternate #2: Add Alternate – Interior build-out option for Mezzanine level In Areas A & B (as indicated in the drawings).
- Alternate #3: Add Alternate – Area F (as indicated in the drawings).
- Alternate #4: Deduct Alternate – In concrete slabs-on-grade to provide fiber mesh reinforcing in lieu of wire mesh in slabs, unless noted otherwise.
- Alternate #5: Deduct Alternate –Interior build-out for Area E (as indicated in the drawings). Floor slab and underfloor systems to be included in the scope of the work.
- Alternate #6: Price for Siemens HVAC control system as described in Specification Section 23 09 23 Direct Digital Control (DDC) Systems in lieu of the specified manufacturer and system.
- Alternate #7: Price for Honeywell HVAC control system as described in Specification Section 23 09 23 Direct Digital Control (DDC) Systems in lieu of the specified manufacturer and system.

Schedule of Unit Prices:

Unit Price 1: Removal And Replacement Of Unsuitable Foundation Material/UNIT PRICE.

Price for removal of unsuitable foundation material and replacement with engineered fill material (refer to section 31 20 00 Earthmoving.)

Informational Bid items:

Informational Bid #1: Concession area grease interceptors

Informational Bid #2: Concession area grease hood make-up air system

Lump Sum Allowance for Additional Information Technology

Provide a lump sum allowance to be included in the Base Bid of One Hundred and Fifty Thousand Dollars (\$150,000.00) . The allowance will be used for active IT network equipment in addition to the fiber and copper backbone cabling, patch panels and support and pathway systems which are included in the Construction Documents.

22. FOCUS ON ENERGY& STATE/FEDERAL ENERGY INCENTIVES

- A. Successful Bidder shall be required to work with County to pursue financial incentives available from, but not limited to, the Focus on Energy program. Contractor shall work with their suppliers to determine advantageous material that meet the specifications that will qualify for Focus on Energy rebates. Contractor will supply the County with lists of materials for submission by the County to the Focus on Energy program.
- B. Other additional State and Federal incentive programs may be pursued by the County. The Contractor shall be responsible for providing lists of materials used on the project (with details of energy efficiency) that the County may need to complete grant applications.

23. COUNTY DIRECT PURCHASE MATERIALS & EQUIPMENT

- A. The County will use its tax-exempt status to purchase materials that will become part of this construction project. In preparing your bid, include all labor, materials and tax in your Bid totals. If the County elects to exercise its tax exempt status to purchase materials and equipment, the contract (when issued) will deduct the cost of materials selected for direct purchase and the related sales tax from your bid total.
- B. Products excluded from purchase by County include products manufactured or fabricated by Contractor, products which Contractor would be the vendor, products which would be furnished and installed by the same entity.
- C. Do not include miscellaneous material such as, but not limited to: mortar, sealants, anchors, connectors, glue, accessories, etc. Items such as these are to be furnished and purchased by the installing contractors as required for their respective work.
- D. For materials where the quantities are not easily identifiable from the Construction Documents, such as, but not limited to, concrete and piping, the Contractor will be responsible for quantities and costs exceeding the quantity and cost stated on the purchase order.

- E. The Contractor shall provide all services necessary to facilitate the purchase of these materials and equipment including, but not limited to, preparation of proposed purchase orders, recommendations of suppliers and vendors, receipt, unloading, storage, and protection of materials and equipment. All purchases by the County shall be used for the sole benefit of the County.
- F. The County shall cause all materials and equipment purchased directly to be delivered to the Contractor who shall accept delivery as the County's agent and promptly notify the Architect / Engineer thereof. When the materials and/or equipment are delivered to the jobsite, the Contractor shall promptly inspect them and bring to the attention of the County and Architect / Engineer any defects therein. The Contractor shall assist in contacting the Supplier in an effort to correct and adjust any defect.
- G. The Contractor shall have the same responsibilities for installation of materials and equipment provided by the County as he would have if purchased by the Contractor. The Contractor shall be responsible for any damage to such materials and equipment after delivery and installation and prior to turning the project over to the County. The Contractor is responsible for obtaining product warranties with regard to those materials and equipment purchased by the County.

FORM A

**DANE COUNTY
EMERGING SMALL BUSINESS REPORT - CERTIFICATION**

In accordance with General Conditions of Contract, submit this Emerging Small Business Report within ten (10) days after Bid Due Date.

PROJECT NAME: _____

BID NO.: _____ BID DUE DATE: _____

BIDDER INFORMATION

COMPANY NAME: _____

ADDRESS: _____

TELEPHONE NO.: _____

CONTACT PERSON: _____

FORM B

**DANE COUNTY
EMERGING SMALL BUSINESS REPORT - INVOLVEMENT**

Page ___ of ___
(Copy this Form as necessary to provide complete information)

COMPANY NAME: _____

PROJECT NAME: _____ BID NO.: _____

ESB NAME: _____ CONTACT PERSON: _____

ADDRESS: _____ PHONE NO.: _____

CITY: _____ STATE: _____ ZIP: _____

Indicate percentage of financial commitment to this ESB: _____ % Amount: \$ _____

ESB NAME: _____ CONTACT PERSON: _____

ADDRESS: _____ PHONE NO.: _____

CITY: _____ STATE: _____ ZIP: _____

Indicate percentage of financial commitment to this ESB: _____ % Amount: \$ _____

ESB NAME: _____ CONTACT PERSON: _____

ADDRESS: _____ PHONE NO.: _____

CITY: _____ STATE: _____ ZIP: _____

Indicate percentage of financial commitment to this ESB: _____ % Amount: \$ _____

FORM C

**DANE COUNTY
EMERGING SMALL BUSINESS REPORT - CONTACTS**

Page ___ of ___

(Copy this Form as necessary to provide complete information)

COMPANY NAME: _____

PROJECT NAME: _____ BID NO.: _____

<u>ESB FIRM NAME CONTACTED</u>	<u>DATE</u>	<u>PERSON CONTACTED</u>	<u>DID ESB BID?</u>	<u>DID YOU ACCEPT BID?</u>	<u>REASON FOR REJECTION</u>
1) _____	_____	_____	_____	_____	_____
2) _____	_____	_____	_____	_____	_____
3) _____	_____	_____	_____	_____	_____
4) _____	_____	_____	_____	_____	_____
5) _____	_____	_____	_____	_____	_____
6) _____	_____	_____	_____	_____	_____
7) _____	_____	_____	_____	_____	_____

FORM D

**DANE COUNTY
EMERGING SMALL BUSINESS REPORT - CERTIFICATION STATEMENT**

I, _____, _____ of
Name Title

_____ certify to best of my knowledge and
Company

belief that this business meets Emerging Small Business definition as indicated in Article 9 and
that information contained in this Emerging Small Business Report is true and correct.

Bidder's Signature

Date

(Page Intentionally Left Blank)



Construction • Geotechnical
Consulting Engineering/Testing

April 15, 2013
C13078

Mr. Robert Nebel
Dane Co. Department of Public Works
1919 Alliant Energy Center Way
Madison, WI 53713

Re: Geotechnical Exploration
Proposed Barns & Maintenance Building
Alliant Energy Center Grounds
Madison, Wisconsin

Dear Mr. Nebel:

Construction • Geotechnical Consultants, Inc. (CGC) has completed the subsurface exploration program for the above-referenced project. The purpose of this program was to evaluate the subsurface conditions within the proposed construction areas and to provide geotechnical recommendations regarding site preparation, foundation, floor slab and pavement design/construction. A determination of the site class for seismic design is also addressed, along with stormwater infiltration potential. An electronic copy of this report is provided for your use, and a paper copy can be provided upon request.

PROJECT DESCRIPTION

The livestock and exhibition barns will be replaced with new structures where the existing barns are situated west of the Coliseum and north of the Dane County Public Works Building along Alliant Energy Center Way. Stormwater infiltration features may also be constructed west of the new barns. In addition, an approximately 160 ft x 80 ft maintenance building is proposed southwest of the new barn area. Based on the existing topography across the two areas, we anticipate only minor grading will be required to develop each site (i.e., about 2 ft of cut and/or fill). Buildings will likely be pre-engineered metal structures so footing loads are expected to be relatively light.

SITE AND SUBSURFACE CONDITIONS

The site for the proposed new barns consists of the existing barns surrounded by asphalt pavement, except for the western portion that is mantled by gravel, grass or a fenced-in elliptical area for horse training. A portion of this western segment was reported to be possibly an "old" landfill as depicted on the attached Boring Location Map No. 1. Site grades dip downward to the west and north and vary between about EL 864 to EL 852 (USGS Datum).

The site for the proposed maintenance building is an open grassy field that grades downward toward the north from EL 858 to EL 854. Bram Street borders the site to the north as shown on the attached Boring Location Map No. 2.

Subsurface conditions on the barn site were explored by drilling 10 Standard Penetration Test (SPT) borings identified as No. 1 to 10 to depths of 20 ft below existing site grades. Borings on the maintenance building site identified as M1 to M6 were drilled to depths of 15 to 20 ft. The boring locations shown on

Mr. Robert Nebel
Dane Co. Department of Public Works
April 15, 2013
Page 2

each of the two location maps were selected by others. (Note that Boring 9 for the barns was offset to the west near the edge of pavement for easier access.) The borings were drilled on April 3 and 5, 2013 by Badger State Drilling (under subcontract to CGC) using a truck-mounted rig for the barns and an ATV track-mounted rig for the maintenance building, both equipped with hollow stem augers. The elevations at the borehole locations were estimated by interpolating between contours on DCI maps generated by Dane County's GIS website and therefore should be considered approximations.

The subsurface profile at the boring locations for each site appears to be fairly uniform over large portions, based on the soil boring information, and can generally be described by the following strata (in descending order):

a. Barns Eastern Portion (Borings 1 to 5)

- 3 to 5 in. of *asphalt* over 6 to 10 in. of *base course*; underlain by
- 0 to 4.5 ft of loose to medium dense *possible sand fill*; underlain by
- 2 to 4.5 ft of stiff to very stiff brown lean *clay* (absent in Boring 1); followed by
- Loose to very dense *granular soils* to the maximum depth explored that contain varying percentages of silt, clay and gravel; with the lower portion considered *weathered sandstone bedrock*.

b. Barns Western Portion (Borings 6 to 10)

- 4 in. *asphalt*/8 to 10 in. *base course* or 6 to 12 in. *topsoil* or 12 in. *base course*; underlain by
- 2 to about 8 ft of *fill* involving sand, silt, clay, gravel, topsoil, and scattered rubble (including organic clay/buried topsoil in Boring 8 and peat in Boring 9); over
- 0 to 6.5 ft of medium stiff to very stiff gray lean *clay*; followed by
- Loose to dense *granular soils* to the maximum depth explored that contain varying percentages of silt, clay and gravel; with the lower portion in Borings 7, 8 and 9 considered *weathered sandstone bedrock*. As an exception, a very stiff clay layer was observed in Boring 10 from 17 to 20 ft.

c. Maintenance Building (Borings M1 to M6)

- 8 to 12 in. of *topsoil fill*; over
- 2 to about 5 ft of *fill* involving intermixed clay, sand and gravel; over
- 2.5 ft of *organic silt and/or peat* in Borings M1, M4 and M6 (not detected in Borings M2, M3 and M5); over
- 2.5 to 6.5 ft of medium stiff to stiff gray to brown silty to organic *clay* (absent in Boring M5); over
- Loose to dense *granular soils* to the maximum depth explored that contain varying percentages of silt, clay and gravel.

Mr. Robert Nebel
Dane Co. Department of Public Works
April 15, 2013
Page 2

each of the two location maps were selected by others. (Note that Boring 9 for the barns was offset to the west near the edge of pavement for easier access.) The borings were drilled on April 3 and 5, 2013 by Badger State Drilling (under subcontract to CGC) using a truck-mounted rig for the barns and an ATV track-mounted rig for the maintenance building, both equipped with hollow stem augers. The elevations at the borehole locations were estimated by interpolating between contours on DCI maps generated by Dane County's GIS website and therefore should be considered approximations.

The subsurface profile at the boring locations for each site is fairly uniform over large portions, based on the soil boring information, and can generally be described by the following strata (in descending order):

a. **Barns Eastern Portion (Borings 1 to 5)**

- 3 to 5 in. of *asphalt* over 6 to 10 in. of *base course*; underlain by
- 0 to 4.5 ft of loose to medium dense *possible sand fill*; underlain by
- 2 to 4.5 ft of stiff to very stiff brown lean *clay* (absent in Boring 1); followed by
- Loose to very dense *granular soils* to the maximum depth explored that contain varying percentages of silt, clay and gravel; with the lower portion considered *weathered sandstone bedrock*.

b. **Barns Western Portion (Borings 6 to 10)**

- 4 in. *asphalt*/8 to 10 in. *base course* or 6 to 12 in. *topsoil* or 12 in. *base course*; underlain by
- 2 to about 8 ft of *fill* involving sand, silt, clay, gravel, topsoil, and scattered rubble (including organic clay/buried topsoil in Boring 8 and peat in Boring 9); over
- 0 to 6.5 ft of medium stiff to very stiff gray lean *clay*; followed by
- Loose to dense *granular soils* to the maximum depth explored that contain varying percentages of silt, clay and gravel; with the lower portion in Borings 7, 8 and 9 considered *weathered sandstone bedrock*. As an exception, a very stiff clay layer was observed in Boring 10 from 17 to 20 ft.

c. **Maintenance Building (Borings M1 to M6)**

- 8 to 12 in. of *topsoil fill*; over
- 2 to about 5 ft of *fill* involving intermixed clay, sand and gravel; over
- 2.5 ft of *organic silt and/or peat* in Borings M1, M4 and M6 (not detected in Borings M2, M3 and M5); over
- 2.5 to 6.5 ft of medium stiff to stiff gray to brown silty to organic *clay* (absent in Boring M5); over
- Loose to dense *granular soils* to the maximum depth explored that contain varying percentages of silt, clay and gravel.



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Groundwater was encountered in the borings at depths of 6 to 13.5 ft during or shortly after drilling. Groundwater levels are expected to fluctuate with seasonal variations in precipitation, infiltration, evapotranspiration, lake stages and other factors. A more detailed description of the site soil and groundwater conditions is presented on the Soil Boring Logs attached in Appendix B.

DISCUSSION AND RECOMMENDATIONS

Subject to the limitations discussed below and based on the subsurface exploration, it is our opinion that the site is suitable for the proposed construction and that the structures can be supported by conventional spread footing foundations. Undercutting/replacement will be needed for the maintenance building and for the barns in the area of Borings 7 to 10 to address soils that are considered unacceptable for building support. Our recommendations for site preparation, foundation, floor slab, pavement and stormwater infiltration design/construction are presented in the following subsections. Additional information regarding the conclusions and recommendations presented in this report is discussed in Appendix C.

1. Site Preparation

We recommend that the asphalt pavement and/or topsoil be stripped/removed at least 5 ft beyond the proposed construction areas, including areas required for cuts and fills beyond the proposed building footprints or pavement limits. Following removal, the exposed subgrades are expected to consist of granular base course where pavements are present or clays/sands (both fill and natural). Exposed soils in areas to receive fill *in proposed pavement areas* should be proof-rolled with a heavy piece of construction equipment. If yielding soft/loose areas are detected, they should be undercut/removed. Grade should be re-established using granular backfill compacted to at least 95% compaction based on modified Proctor methods (ASTM D1557) or compacted coarse stone (breaker run, select crushed material or 3-in. dense graded base course, as described in Appendix D).

We recommend existing fill and buried organics in building areas be undercut by mass excavation to expose natural soils because these soils are considered unacceptable for building support. The areas of concern are primarily where the maintenance building is proposed and the western portion of the barn construction area. Undercuts should be widened a minimum of a half foot per foot of depth extending outward from the outside edge of the perimeter footings, with dewatering provided as needed to control infiltration. The initial lift of backfill should be at least 6 in. of 3-in. dense graded base worked into the subgrade until deflection ceases. This may require multiple lifts. Granular backfill should then follow (see below).

We recommend using granular soils as structural fill (i.e., below structures and possibly pavement), as these soils are generally easier to place and compact in most weather conditions. Note that the on-site sand soils from cut areas (if any) are considered adequate for use as structural fill. We do not recommend using clay/silt soils as structural fill because moisture conditioning will likely be required to achieve desired compaction levels, which could delay construction progress. Instead, silt/clay soils can be used as fill in landscaped areas and possibly below proposed pavements. Structural fill/backfill should be compacted to at least 95% (ASTM D1557) in accordance with our Recommended Compacted Fill Specifications



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presented in Appendix D, with 90% acceptable for clays placed in pavement areas and 85% in landscaped areas. Periodic field density tests should be taken by CGC staff within the fill/backfill to document the adequacy of compactive effort.

2. Foundation Design

The foundations for the proposed buildings will generally bear within newly-placed granular fill or natural soils (both lean clay or granular). In our opinion, the proposed structures can be supported on reinforced concrete spread footing foundations bearing on the native cohesive and granular soils (including granular fill), and the following parameters should be used for foundation design:

- Maximum allowable bearing pressure: 3,000 psf
- Minimum foundation widths:
 - Continuous wall footings: 18 in.
 - Column pad footings: 30 in.
- Minimum footing depths:
 - Exterior/perimeter footings: 4 ft
 - Interior footings: no minimum requirement

Undercutting below footing grade will be required if natural loose sands or clay soils with pocket penetrometer readings (an estimate of the clay's unconfined compressive strength) of less than 1.5 ton/sq ft are encountered at or below footing grade. Where undercutting is required, the base of the undercut excavations should be widened beyond the footing edges at least 0.5 ft for each foot of undercut depth for stress distribution purposes. Footing grade can be restored with compacted granular soils densified to at least 95% (ASTM D1557).

Providing the foundation design/construction recommendations discussed above are followed, we estimate that total and differential settlements should not exceed 1.0 and 0.5 in., respectively. To reduce subgrade disturbance, we recommend that a smooth-edge backhoe bucket be used.

3. Seismic Design Category

In our opinion, the average soil/rock properties in the upper 100 ft of the site (based on SPT blow count (N-values) that will trend greater than 50 blows/ft on average because of nearby bedrock) can be characterized as a very dense soil profile. This characterization would place the site in Site Class C for seismic design according to the International Building Code (see Table 1615.1.1)

4. Floor Slab

Based on our understanding of probable building grades changing very little from existing grades, we anticipate that after removing the existing asphalt and topsoil, floor slab subgrades will likely consist of firm natural soils or newly-placed granular fill. Under this assumption, we recommend that the floor slab

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for the proposed structures be designed using a subgrade modulus of 100 pci. Prior to slab construction, the subgrades should be recompacted to densify soils that may become disturbed or loosened during construction activities. The design subgrade modulus is based on a recompacted subgrade such that non-yielding conditions are developed. Areas which do not proof-roll satisfactorily should be undercut and replaced with compacted breaker rock or granular fill. To serve as a capillary break, the final 4 in. of soil placed below the slabs should consist of imported well-graded sand or gravel with no more than 5 percent by weight passing a No. 200 U.S. standard sieve. (Note that some structural engineers require a 4 to 6 in. layer of dense-graded base course immediately below the floor slab, in lieu of the capillary break, to improve the subgrade modulus.) To further minimize the potential for moisture migration, a plastic vapor barrier could also be utilized. Fill placed below the floor slabs should be placed as described in the Site Preparation section of this report. The slabs should be structurally separate from the foundations and have construction joints and wire mesh for crack control.

5. Pavement Design

Depending on final pavement grades, we anticipate that the subgrade soils within the parking and drive areas will consist of natural or existing clays/sands (both fill and natural) or newly-placed engineered fill. Pavement subgrades should be proof-rolled/recompacted as described in the Site Preparation section of this report and stabilized as needed with 3 in. dense graded base or replaced with compacted granular fill. Based on somewhat variable surface soils across the site, we anticipate that some undercutting or stabilization may be required during site preparation (discussed above) or during pavement subgrade preparation. We recommend that the project budget include a contingency for undercutting or stabilization.

We assume that the parking lot pavement will be subjected to mainly automobile traffic with minimum truck traffic (i.e., Traffic Class I, which includes less than one design daily equivalent 18-kip single axle load – ESAL and parking lots with less than 50 stalls). The drive lanes and some parking areas will likely experience larger truck volumes (i.e., up to about 5 daily ESALs). Note that for the heavier pavement section in truck traffic areas, we have included two approximately equivalent sections – a thicker unreinforced section and a thinner geogrid-reinforced section. The thickness of the geogrid-reinforced section is the same as the thickness of the lighter (car parking) section, which may simplify site grading. The variable fill soils (some of which are clays) will control the pavement thickness design. Accordingly, the pavement sections tabulated below were selected assuming a CBR of approximately 2 and a design life of 20 years. Note that if pavement grades are to change more than 2 ft that potential settlement may occur that could shorten the design life due to consolidation of underlying organic soils and “old” fill. Placement of fill early in the construction sequence in pavement areas will promote settlement prior to placing asphalt which will reduce this potential risk.

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**TABLE 1
 RECOMMENDED PAVEMENT SECTIONS**

Material	Thickness, in.		WDOT Specification ¹	
	Car Parking – Less than 1 ESAL	Drive Lanes and Truck Traffic Areas – Less than 5 ESALs		
		Unreinforced		Reinforced
Bituminous Upper Layer	1.5	1.75	1.5	Section 460, Table 460-1, 12.5 mm
Bituminous Lower Layer	1.5	2.25	1.5	Section 460, Table 460-1, 19.0 mm
Dense Graded Base (crushed aggregate base course)	9.0	11.0	9.0	Sections 301 and 305, 75 mm and 31.5 mm
Geogrid reinforcement	No	No	Yes	Tensar BX1200 Geogrid or equivalent
TOTAL THICKNESS	12.0	15.0	12.0	

Notes:

1. Wisconsin DOT *Standard Specifications for Highway and Structure Construction*, latest edition, including supplement specifications, but excluding Section 460.3.2 relating layer thickness by aggregate size.
2. Compaction requirements:
 - Bituminous concrete: Refer to Section 460-3.
 - Base course: Refer to Section 301.3.4.2, Standard Compaction
3. Mixture Type E-0.3 bituminous pavement is recommended; refer to Section 460, Table 460-2 of the *Standard Specifications*.

Note that if traffic volumes are greater than those assumed, CGC should be allowed to review the recommended pavement sections and adjust them accordingly. The pavement design assumes a stable/non-yielding subgrade and a regular program of preventative maintenance. Alternative pavement designs may prove acceptable and should be reviewed by CGC. If there is a delay between subgrade preparation and placing the base course, the subgrade should be recompact.

Pavement areas subjected to concentrated wheel loads (i.e., loading docks, dumpster pads, etc.) should be constructed of Portland cement concrete. The slab should be a minimum of 6-in. thick and should contain mesh reinforcement for crack control. A subgrade modulus of 100 pci should be used for concrete pavement design on proof-rolled/recompact subgrades.

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6. Stormwater Infiltration Potential

We understand that stormwater management areas may be constructed in the western portion of the site (i.e., near Borings 7 – 10). The soil profiles in these four borings were somewhat variable but generally involved 3 to 9 ft of variable sand and clay fill over natural clays, peat and silty sand, with weathered sandstone noted in Borings 7 and 8. Based on the low estimated infiltration rates in the fill and natural clay soils, the western portion of the site may be classified as “exempted” based on estimated infiltration rates of less than 0.6 in./hr. Additionally, based on the widespread presence of shallow groundwater and redoximorphic features (e.g., redox or mottling), which suggests seasonal or past saturation, this site may be considered “excluded” based on insufficient separation between the bottom of the infiltration feature and groundwater. Therefore, it is our opinion that this portion of the site does not appear suitable to infiltrate significant quantities of stormwater.

According to Table 2 of the WDNR Conservation Practice Standard 1002, *Site Evaluation for Storm Water Infiltration*, the following estimated infiltration rates can be used for design:

• Clay loam	0.03 in./hr
• Silty clay loam	0.04 in./hr
• Silty clay	0.07 in./hr
• Sandy clay loam	0.11 in./hr
• Silt loam	0.13 in./hr
• Loam	0.24 in./hr
• Sandy Loam	0.5 in./hr
• Loamy Sand	1.63 in./hr
• Sand	3.6 in./hr

Note that the infiltration rates should be considered very approximate. The Wisconsin Department of Safety and Professional Services soil evaluation forms for Borings 7 through 10 are included in Appendix E.

The limiting layers to stormwater infiltration are summarized below:

Groundwater: Groundwater was encountered in Borings 7 through 10 at 5 to 9.5 ft below existing site grades. Additionally, redoximorphic features (i.e., redox or mottling) were encountered in some of the shallow clay soils in these borings, which suggests seasonal or past saturation. Groundwater levels should be expected to vary across the site and seasonally, as previously discussed.

Bedrock: Apparent weathered sandstone bedrock was encountered in Borings 7 and 8 at 11 to 13.5 ft below existing site grades. The depth to bedrock should be expected to vary across the site.

During construction of the proposed building addition and related site work, appropriate erosion control should be provided to prevent eroded soil from contaminating the infiltration areas. Where appropriate, the basin design should include pretreatment to remove fine-grained soils (silt/clay) from stormwater prior to

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entering the infiltration area. Additionally, a regular maintenance plan should be developed to remove silt/clay soils that may accumulate in the bottom of the infiltration basin over time. Failure to adequately control fine-grained soils from entering the infiltration area or failure to regularly remove fine-grained soils that accumulate at the base of the infiltration basin will likely cause the basin to fail. Refer to WDNR Conservation Practice Standard 1002 and NR 151 for additional information.

CONSTRUCTION CONSIDERATIONS

Due to variations in weather, construction methods and other factors, specific construction problems are difficult to predict. Soil related difficulties which could be encountered on the site are discussed below:

- Due to the potentially sensitive nature of some of the on-site soils, we recommend that final site grading activities be completed during dry weather, if possible. Construction traffic should be avoided on prepared subgrades to minimize potential disturbance.
- Contingencies in the project budget for subgrade stabilization with breaker run stone in parking and floor slab areas should be increased if the project schedule requires that work proceed during adverse weather conditions.
- Earthwork construction during the early spring or late fall could be complicated as a result of wet weather and freezing temperatures. During cold weather, exposed subgrades should be protected from freezing before and after footing construction. Fill should never be placed while frozen or on frozen ground.
- Excavations extending greater than 4 ft in depth below the existing ground surface should be sloped or braced in accordance with current OSHA standards.
- Based on observations made during the field exploration, groundwater infiltration into footing excavations is not expected other than possibly in building undercut areas. Water accumulating at the base of excavations as a result of precipitation or seepage should be controlled and quickly removed using pumps operating from filtered sump pits.

RECOMMENDED CONSTRUCTION MONITORING

The quality of the foundation, floor slab and pavement subgrades will be largely determined by the level of care exercised during site development. To check that earthwork and foundation construction proceeds in accordance with our recommendations, the following operations should be monitored by CGC:

- Pavement stripping/subgrade proof-rolling within the construction areas;
- Fill/backfill placement and compaction;
- Foundation excavation/subgrade preparation; and
- Concrete placement.



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* * * * *

It has been a pleasure to serve you on this project. If you have any questions or need additional consultation, please contact us.

Sincerely,

CGC, Inc.

Michael N. Schultz, P.E.
Principal/Consulting Professional

William W. Wuellner, P.E.
Senior Geotechnical Engineer

- Encl: Appendix A - Field Exploration
Appendix B - Soil Boring Location Maps (2)
Logs of Test Borings (16)
Log of Test Boring-General Notes
Unified Soil Classification System
Appendix C - Document Qualifications
Appendix D - Recommended Compacted Fill Specifications
Appendix E - WI Dept. of SPS Soil Evaluation Forms (4 borings)

APPENDIX A

FIELD EXPLORATION

APPENDIX A

FIELD EXPLORATION

Subsurface conditions on site were explored by drilling 16 Standard Penetration Test (SPT) soil borings to depths up to 20 ft below existing site grades. The locations were selected by others and field staked by CGC and/or Dane County staff. The borings were drilled on April 3 and 5, 2013 by Badger State Drilling (under subcontract to CGC) using track- and truck-mounted drill rigs equipped with hollow-stem augers. The boring locations are shown in plan on the Soil Boring Location Map attached in Appendix B. Ground surface elevations were estimated as described in the report text.

In each boring, soil samples were obtained at 2.5 foot intervals to a depth of 10 ft and at 5 ft intervals thereafter. The soil samples were obtained in general accordance with specifications for standard penetration testing, ASTM D 1586. The specific procedures used for drilling and sampling are described below.

1. Boring Procedures between Samples

The boring is extended downward, between samples, by a hollow-stem auger.

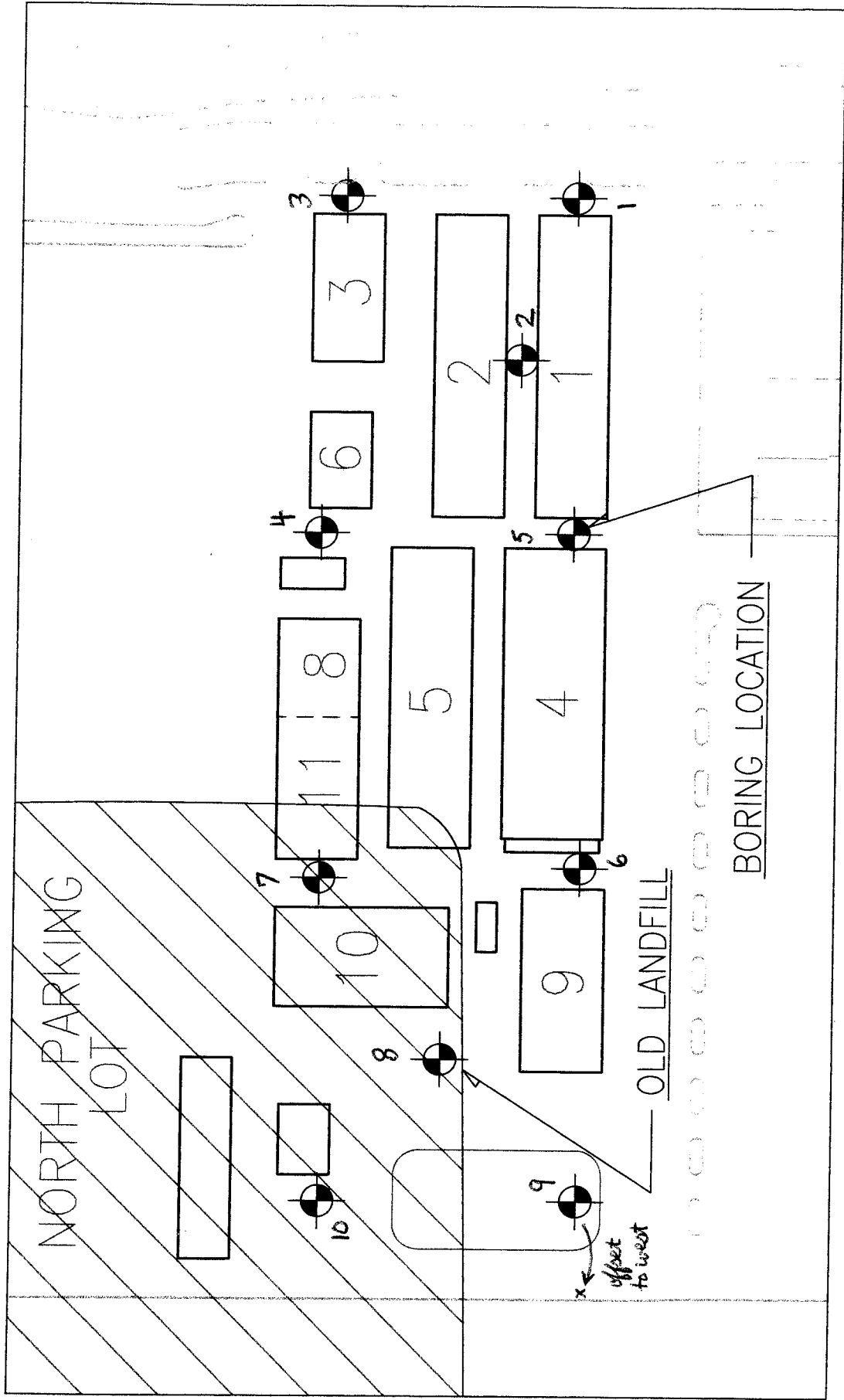
2. Standard Penetration Test and Split-Barrel Sampling of Soils
(ASTM Designation: D 1586)

This method consists of driving a 2-inch outside diameter split-barrel sampler using a 140-pound weight falling freely through a distance of 30 inches. The sampler is first seated 6 inches into the material to be sampled and then driven 12 inches. The number of blows required to drive the sampler the final 12 inches is recorded on the log of borings and is known as the Standard Penetration Resistance.

During the field exploration, the driller visually classified the soil and prepared a field log. *Field screening of the soil samples for possible environmental contaminants was not conducted by the drillers as these services were not part of CGC's work scope.* Water level observations were made in each boring during and after drilling and are shown at the bottom of each boring log. Upon completion of drilling, the borings were backfilled with bentonite (where required) to satisfy WDNR regulations and the soil samples were delivered to our laboratory for visual classification and laboratory testing. The soils were visually classified by a geotechnical engineer using the Unified Soil Classification System. The final logs prepared by the engineer and a description of the Unified Soil Classification System are presented in Appendix B.

APPENDIX B

**SOIL BORING LOCATION MAPS (2)
LOGS OF TEST BORINGS (16)
LOG OF TEST BORING - GENERAL NOTES
UNIFIED SOIL CLASSIFICATION SYSTEM**



Legend



Denotes Soil Boring Location and Number



Scale: Unknown

Notes

1. Base map provided by Dane County.
2. Soil borings drilled by Badger State Drilling in April 2013.
3. Boring locations are approximate.

Date: 4/2013

Job No. C13078



SOIL BORING LOCATION MAP
 Proposed Barn Area
 Alliant Energy Center Grounds
 Madison, Wisconsin

EXIST. TREE LINE

LYCKBERG

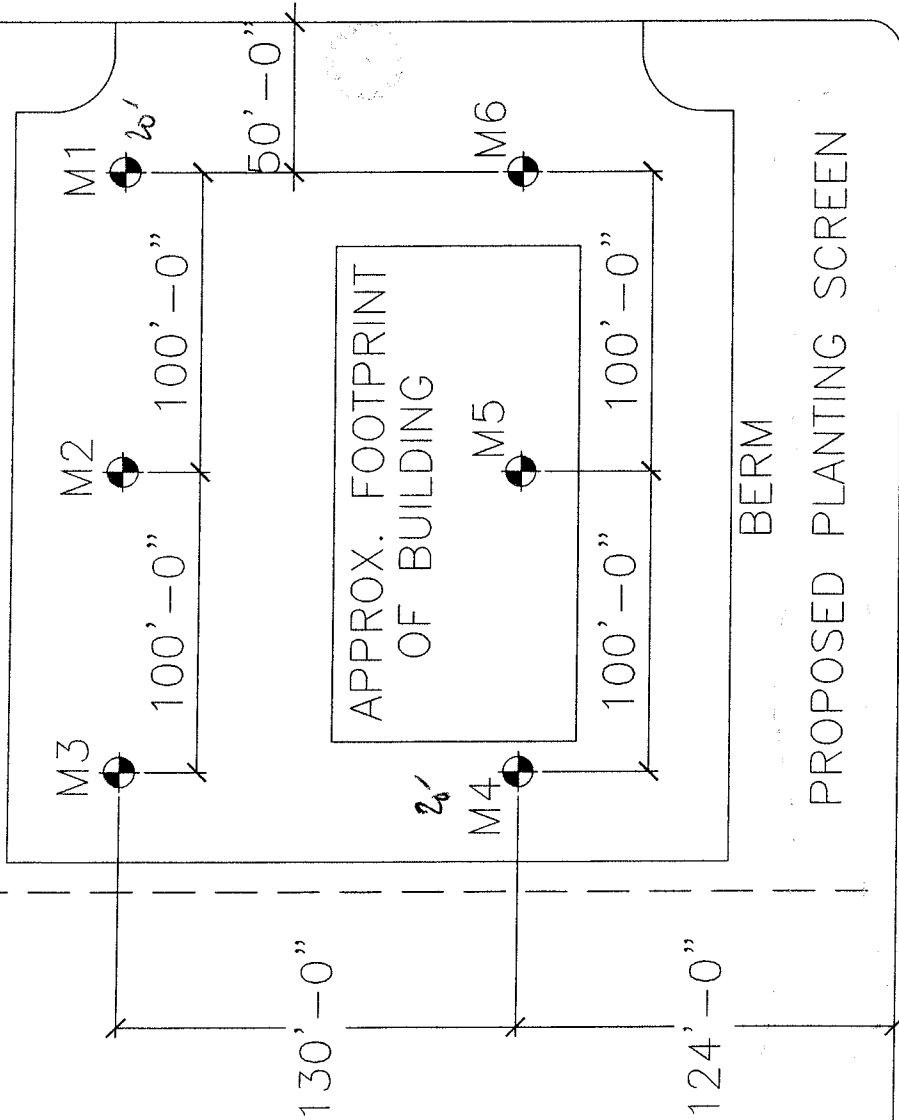
PARK

PARK
PAVILION

BRAM ST

STREET
BLOCKED

PROPOSED
STORM
WATER
BASIN



West End of South Parking Lot



Scale: Unknown

Denotes Soil Boring Location and Number

Legend



Notes

1. Base map provided by Dane County.
2. Soil borings drilled by Badger State Drilling in April 2013.
3. Boring locations are approximate.

Date: 4/2013

Job No. C13078



SOIL BORING LOCATION MAP
Proposed Maintenance Building
Alliant Energy Center Grounds
Madison, Wisconsin



LOG OF TEST BORING

Project AEC Barns
Alliant Energy Center Way
 Location Madison, Wisconsin

Boring No. 1
 Surface Elevation (ft) 863±
 Job No. C13078
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	Rec (in.)	Moist	N	Depth (ft)		q _u (tsf)	W	LL	PL	LI
				5	X	8"± Base Course/4" Asphalt Pavement Medium Dense, Brown Fine to Medium SAND, Some Silt and Gravel (SM) (Possible Fill)				
1	12	M	12							
2	18	M	23							
3	18	M	30			Dense to Very Dense, Red-Brown/Brown/Yellowish-Green Weathered SANDSTONE Bedrock				
4	18	M	31							
5	15	W	62	15	▼					
6	1	W	50/3"	20						
End Boring at 20 ft										
Borehole backfilled with bentonite chips										

WATER LEVEL OBSERVATIONS

GENERAL NOTES

While Drilling ∇ 13.5' Upon Completion of Drilling _____
 Time After Drilling _____ 7 hrs
 Depth to Water _____ 14.0 ▼
 Depth to Cave in _____ 15.0'

Start 4/3/13 End 4/3/13
 Driller BSD Chief KD Rig CME-55
 Logger MC Editor MNS
 Drill Method 2 1/4" HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



LOG OF TEST BORING

Project AEC Barns
Alliant Energy Center Way
 Location Madison, Wisconsin

Boring No. 2
 Surface Elevation (ft) 862.5±
 Job No. C13078
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE REMARKS	Rec (in.)	Moist	N		Depth (ft)	qu (qa) (tsf)	W	LL	PL
					X	8" Base Course/3" Asphalt Pavement				
1		12	M	8	8	Very Stiff, Brown Lean CLAY (CL)				
2		15	M	12	12	Medium Dense to Very Dense, Red-Brown/Brown/Yellowish-Green Weathered SANDSTONE Bedrock				
3		12	M	83/8"	13.375					
4		18	M	29	29					
5		10	M	50/3"	16.667					
6		5	M	50/5"	20					
End Boring at 20 ft										
Borehole backfilled with bentonite chips										

WATER LEVEL OBSERVATIONS

GENERAL NOTES

While Drilling NW Upon Completion of Drilling _____
 Time After Drilling _____ 4 hrs
 Depth to Water _____ 13.0' ▼
 Depth to Cave in _____ 15.0'

Start 4/3/13 End 4/3/13
 Driller BSD Chief KD Rig CME-55
 Logger MC Editor MNS
 Drill Method 2 1/4" HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



LOG OF TEST BORING

Project AEC Barns
Alliant Energy Center Way
 Location Madison, Wisconsin

Boring No. 3
 Surface Elevation (ft) 861±
 Job No. C13078
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
No.	DEPTH (ft)	Rec (in.)	Moist	N		Depth (ft)	qu (qa) (tsf)	W	LL	PL	LI
					5	X	8" Base Course/4" Asphalt Pavement				
1	18	M	9		10	.	Loose, Brown Fine to Medium SAND, Some Silt and Gravel (SM) (Possible Fill)				
2	10	M	11		15	/	Stiff, Brown Lean CLAY (CL)				
3	10	M	17		20	-	Medium Dense to Very Dense, Red-Brown/Brown/Yellowish-Green Weathered SANDSTONE Bedrock				
4	18	M	11		25	v					
5	18	W	27		30	v					
6	15	W	59/9"		35	v					
End Boring at 20 ft											
Borehole backfilled with bentonite chips											

WATER LEVEL OBSERVATIONS

GENERAL NOTES

While Drilling ∇ 13.5' Upon Completion of Drilling _____
 Time After Drilling _____ 6 hrs
 Depth to Water _____ 8.0' ∇
 Depth to Cave in _____ 13.5'

Start 4/3/13 End 4/3/13
 Driller BSD Chief KD Rig CME-55
 Logger MC Editor MNS
 Drill Method 2 1/4" HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



LOG OF TEST BORING

Project AEC Barns
 Location Alliant Energy Center Way
Madison, Wisconsin

Boring No. 4
 Surface Elevation (ft) 860±
 Job No. C13078
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
No.	Type Exp Pen	Rec (in.)	Moist	N		Depth (ft)	q _u (qa) (tsf)	W	LL	PL	LI
					0	X					
1	█	8	M	9	1	/					
					2	/	(1.5)				
2	█	18	M	4	4	.					
					5	.					
3	█	18	M	12	12	.					
					10	.					
4	█	18	M	13	13	.					
					15	.					
5	█	18	W	22	22	.					
					20	.					
6	█	18	W	20	20	.					
					25	.					

End Boring at 20 ft
 Borehole backfilled with bentonite chips

WATER LEVEL OBSERVATIONS

GENERAL NOTES

While Drilling 13.5' Upon Completion of Drilling _____
 Time After Drilling _____ 5 hrs
 Depth to Water _____ 10.0' ▼
 Depth to Cave in _____ 11.0'

Start 4/3/13 End 4/3/13
 Driller BSD Chief KD Rig CME-55
 Logger MC Editor MNS
 Drill Method 2 1/4" HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



LOG OF TEST BORING

Project AEC Barns
Alliant Energy Center Way
 Location Madison, Wisconsin

Boring No. 5
 Surface Elevation (ft) 862±
 Job No. C13078
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	Ex. Rec (in.)	Moist	N	Depth (ft)		q _u (qa) (tsf)	W	LL	PL	LI
					10" Base Course/5" Asphalt Pavement					
1	9	M	12		Very Stiff, Brown Lean CLAY (CL)	(2.0)				
2	0	M	8			(2.25)				
3	15	M	9		Loose, Brown Silty to Clayey Fine SAND (SM/SC)					
4	18	M	15		Medium Dense to Very Dense, Red-Brown/Brown/Yellowish-Green Weathered SANDSTONE Bedrock					
5	18	M	16							
6	3	M	50/3"							
					End Boring at 20 ft					
					Borehole backfilled with bentonite chips					

WATER LEVEL OBSERVATIONS

GENERAL NOTES

While Drilling NW Upon Completion of Drilling _____
 Time After Drilling _____ **3 hrs**
 Depth to Water _____ **13.0'** ▼
 Depth to Cave in _____ **15.0'**

Start 4/3/13 End 4/3/13
 Driller BSD Chief KD Rig CME-55
 Logger MC Editor MNS
 Drill Method 2 1/4" HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



LOG OF TEST BORING

Project AEC Barns
Alliant Energy Center Way
 Location Madison, Wisconsin

Boring No. 6
 Surface Elevation (ft) 857±
 Job No. C13078
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
No.	DEPTH (ft)	Rec (in.)	Moist	N		Depth (ft)	qu (qa) (tsf)	W	LL	PL	LI
					X	10" Base Course/4" Asphalt Pavement					
1		10	M	7		FILL: Loose, Intermixed Sand, Clay and Gravel					
2		18	M	6		Stiff, Gray Mottled Lean CLAY (CL)	(1.5)				
3		18	W	9		Loose, Gray Silty to Clayey Fine SAND, Little to Some Gravel (SM/SC)					
4		18	W	20		Medium Dense to Dense, Red-Brown/Brown/Yellowish-Green Weathered SANDSTONE Bedrock					
5		18	W	33							
6		18	W	23							
						End Boring at 20 ft					
						Borehole backfilled with bentonite chips					

WATER LEVEL OBSERVATIONS

GENERAL NOTES

While Drilling ∇ 8.5' Upon Completion of Drilling _____
 Time After Drilling _____ 2 hrs
 Depth to Water _____ 7.0' ∇
 Depth to Cave in _____ 8.0'

Start 4/3/13 End 4/3/13
 Driller BSD Chief KD Rig CME-55
 Logger MC Editor MNS
 Drill Method 2 1/4" HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



LOG OF TEST BORING

Project AEC Barns
Alliant Energy Center Way
 Location Madison, Wisconsin

Boring No. 7
 Surface Elevation (ft) 858±
 Job No. C13078
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES					
No.	DEPTH (ft)	Rec (in.)	Moist	N		Depth (ft)	q _u (qa) (tsf)	W	LL	PL	LI
					X	4" Asphalt Pavement / 8" Base Course					
1		1	M	16		FILL: Brown Silty Fine to Medium Sand and Gravel, Trace Clay Seams USDA: 2.5Y4/3 Gravelly, Sandy Loam, Trace Silty Clay Loam Seams					
2		3	M	9							
3		10	M	10		FILL: Black Loamy Organic Clay, Little Sand, Trace Roots, Gravel and Rubble (Glass Pieces) USDA: 5YR2/1 Clay Loam					
4		18	M	7	▼	Medium Stiff to Stiff, Greenish Gray Mottled Lean CLAY; Trace Hydric Inclusions (CL) USDA: 5BG5/1 Silty Clay (Redox C2F 5Y2/1)	(0.75-1.5)				
5		18	W	11	▽	Medium Dense to Dense, Reddish Brown Silty Fine SAND; Trace Yellowish Brown and Greenish Gray Weathered Sandstone (SM - Weathered Sandstone) USDA: 5YR3/3 Loamy Fine Sand, Few 10YR7/6 Seams					
6		18	W	30							
						End Boring at 20 ft					
						Borehole backfilled with bentonite chips					

WATER LEVEL OBSERVATIONS

GENERAL NOTES

While Drilling ▽ 13.5' Upon Completion of Drilling _____
 Time After Drilling _____ 1 hr
 Depth to Water _____ 9.5' ▼
 Depth to Cave in _____

Start 4/3/13 End 4/3/13
 Driller BSD Chief KD Rig CME-55
 Logger MC Editor MNS
 Drill Method 2 1/4" HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



LOG OF TEST BORING

Project AEC Barns
Alliant Energy Center Way
 Location Madison, Wisconsin

Boring No. 8
 Surface Elevation (ft) 856±
 Job No. C13078
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LI
1	2	M	17	17	6" Dark Brown Sandy/Loamy Clay TOPSOIL (OL) USDA: 10YR2/2 Clay Loam FILL: Dark Brown Organic Clay, Trace Roots USDA: 10YR3/2 Clay Loam	(1.0)				
2	12	M	7	7		Black to Dark Gray Organic CLAY; Few Peat Seams and Layers (OL) USDA: 10YR2/1 Clay Loam				
3	15	M	12	12	Medium Dense, Reddish Brown Silty Fine SAND; Trace Gravel (SM) USDA: 5YR4/4 Sandy Loam					
4	4	M	10	10						
5	18	W	20	20	Medium Dense, Reddish Brown to Greenish Gray Silty Fine SAND; Few Yellowish Brown Weathered Sandstone Seams and Layers (SM - Weathered Sandstone) USDA: 5YR4/4 & 5BG5/1 Loamy Fine Sand, Few 10YR7/6 Seams					
6	18	W	27	27						
End Boring at 20 ft										
Borehole backfilled with bentonite chips										

WATER LEVEL OBSERVATIONS

GENERAL NOTES

While Drilling ∇ 13.5' Upon Completion of Drilling _____
 Time After Drilling _____ 1 hr
 Depth to Water _____ 7.5' ∇
 Depth to Cave in _____

Start 4/5/13 End 4/5/13
 Driller BSD Chief KD Rig CME-55
 Logger MC Editor MNS
 Drill Method 2 1/4" HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



LOG OF TEST BORING

Project AEC Barns
Alliant Energy Center Way
 Location Madison, Wisconsin

Boring No. 9
 Surface Elevation (ft) 853±
 Job No. C13078
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N		Depth (ft)	q _u (qa) (tsf)	W	LL	PI
1	18	M	6		12" Dark Brown Sandy/Loamy Clay TOPSOIL (OL) USDA: 10YR2/2 Clay Loam FILL: Dark Brown Sandy Silt, Mixed with Organic Clay, Trace Gravel	(2.5)				
2	18	M	8		USDA: 10YR3/2 Silt Loam FILL: Black to Dark Brown Organic Clay, Trace Roots, Few Greenish Gray Lean Clay Seams USDA: 10YR3/2 Silty Clay					
3	18	M	6		Black Sedimentary PEAT; Few Seams of Gray Organic Silt (PT) USDA: 10YR2/1 Peaty Silt Loam					
4	12	W	13		Medium Dense, Grayish Brown Silty Fine SAND; Trace Gravel (SM) USDA: 10YR5/2 Sandy Loam					
5	18	W	27		Medium Dense, Brown Fine to Medium SAND; Trace to Little Gravel, Trace Silt (SP) USDA: 10YR6/4 Sand					
6	18	W	28		Medium Dense, Dark Brown Silty Fine SAND; Trace Gravel (SM) USDA: 10YR3/2 Sandy Loam End Boring at 20 ft Borehole backfilled with bentonite chips					

WATER LEVEL OBSERVATIONS	GENERAL NOTES
While Drilling ∇ <u>8.5'</u> Upon Completion of Drilling _____ Time After Drilling _____ <u>10 min.</u> Depth to Water _____ <u>5.0'</u> ∇ Depth to Cave in _____	Start <u>4/5/13</u> End <u>4/5/13</u> Driller <u>BSD</u> Chief <u>KD</u> Rig <u>CME-55</u> Logger <u>MC</u> Editor <u>MNS</u> Drill Method <u>2 1/4" HSA</u>
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.	



LOG OF TEST BORING

Project AEC Barns
Alliant Energy Center Way
 Location Madison, Wisconsin

Boring No. **10**
 Surface Elevation (ft) 856±
 Job No. C13078
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N		Depth (ft)	qu (qa) (tsf)	W	LL	PL
					X	12" Base Course				
1		12	M	16	5	FILL: Medium Dense to Dense, Black Organic Clay, Mixed with Sand and Gravel USDA: 10YR2/1 Clay Loam	(2.5)			
2		12	M	34	5	Obstruction at 5 ft occurred resulting in redrill 5 ft north				
3		18	M	10	10	Very Stiff, Gray Sandy Lean CLAY, Trace to Little Gravel (CL) (Possible Fill) USDA: 10YR4/1 Sandy Clay Loam	(2.25)			
4		18	M	5	10	Stiff, Gray Lean CLAY; Little Fine Sand, Trace Organic Inclusions and Roots (CL) USDA: 5Y4/1 Silty Clay	(1.0)			
5		18	W	6	15	Loose, Gray Silty Fine SAND, Little to Some Gravel, Trace Clay (SM/SC) USDA: 5Y6/1 Sandy Loam				
6		18	W	16	20	Very Stiff, Brown Mottled Lean CLAY; Some Laminated Silt Seams and Layers (CL) USDA: 10YR7/4 Silty Clay (Redox F1F 10YR6/8)	(3.25)			
					20	End Boring at 20 ft				
						Borehole backfilled with bentonite chips				
					25					

WATER LEVEL OBSERVATIONS

GENERAL NOTES

While Drilling ∇ 13.5' Upon Completion of Drilling _____
 Time After Drilling _____ 1/4 hr
 Depth to Water _____ 9.0' ∇
 Depth to Cave in _____

Start 4/5/13 End 4/5/13
 Driller BSD Chief KD Rig CME-55
 Logger MC Editor MNS
 Drill Method 2 1/4" HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



LOG OF TEST BORING

Project AEC Maintenance Building
Bram Street
 Location Madison, Wisconsin

Boring No. M1
 Surface Elevation (ft) 854±
 Job No. C13078
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LI
				0	8 in. TOPSOIL (OL - FILL)					
1	18	M	13	13	FILL: Brown to Gray Lean Clay Intermixed with Sand and Gravel	(2.5)				
2	18	M	11	11	Medium Dense, Black Organic SILT to PEAT (OL/PT)		42.9			11.4
3	18	M	6	6	Medium Stiff to Stiff, Gray Silty to Organic CLAY, Organics (CL-ML/OL)	(0.5-1.0)	32.9			6.9
4	2	M	19	19	End of sample					
5	18	W	15	15	Medium Dense, Brown Silty Fine SAND (SM)					
6	12	W	12	12	End Boring at 20 ft					
					Borehole backfilled with bentonite chips					

WATER LEVEL OBSERVATIONS

GENERAL NOTES

While Drilling ∇ 9.0' Upon Completion of Drilling _____
 Time After Drilling _____ 10 min.
 Depth to Water _____ 9.0' ∇
 Depth to Cave in _____ 11.0'

Start 4/5/13 End 4/5/13
 Driller BSD Chief KD Rig ATV
 Logger MC Editor MNS
 Drill Method 2 1/4" HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



LOG OF TEST BORING

Project AEC Maintenance Building
 Location Bram Street
Madison, Wisconsin

Boring No. M2
 Surface Elevation (ft) 855.5±
 Job No. C13078
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N		Depth (ft)	qu (qa) (tsf)	W	LL	PL
					8 in. TOPSOIL (OL - FILL)					
1		18	M	9	FILL: Brown to Gray Lean Clay Intermixed with Sand and Gravel	(4.0+)				
2		15	M	4						
3			M		Medium Stiff to Stiff, Gray Silty to Organic CLAY, Scattered Organics (CL-ML/OL)	(0.75-1.0)	44.3			
4		12	W	13	Medium Dense, Gray to Brown Fine SAND, Little to Some Silt (SP-SM/SM)					
5		18	W	25						
					End Boring at 15 ft					
					Borehole backfilled with bentonite chips					

WATER LEVEL OBSERVATIONS

GENERAL NOTES

While Drilling ∇ 8.5' Upon Completion of Drilling _____
 Time After Drilling _____ 10 min.
 Depth to Water _____ 7.0' ∇
 Depth to Cave in _____ 10.0'

Start 4/5/13 End 4/5/13
 Driller BSD Chief KD Rig ATV
 Logger MC Editor MNS
 Drill Method 2 1/4" HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



LOG OF TEST BORING

Project AEC Maintenance Building
Bram Street
 Location Madison, Wisconsin

Boring No. **M3**
 Surface Elevation (ft) **856.5±**
 Job No. **C13078**
 Sheet **1** of **1**

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	THIN Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LI
				0	8 in. TOPSOIL (OL - FILL)					
1	18	M	8	8	FILL: Brown to Gray Lean Clay Intermixed with Sand and Gravel	(2.5)				
2	18	M	7	7	Stiff, Brown Mottled Lean CLAY (CL)	(1.5)				
3	18	W	11	11	Medium Dense, Brown Silty Fine SAND (SM)					
4	18	W	8	8	Loose, Brown Silty to Clayey Fine SAND, Little to Some Gravel (SM/SC)					
5	18	W	4	4						
15					End Boring at 15 ft					
Borehole backfilled with bentonite chips										
20										
25										

WATER LEVEL OBSERVATIONS	GENERAL NOTES
While Drilling ∇ <u>6.0'</u> Upon Completion of Drilling _____ Time After Drilling _____ <u>10 min.</u> Depth to Water _____ <u>7.5'</u> ∇ Depth to Cave in _____ <u>8.0'</u>	Start <u>4/5/13</u> End <u>4/5/13</u> Driller <u>BSD</u> Chief <u>KD</u> Rig <u>ATV</u> Logger <u>MC</u> Editor <u>MNS</u> Drill Method <u>2 1/4" HSA</u>
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.	



LOG OF TEST BORING

Project AEC Maintenance Building
Bram Street
 Location Madison, Wisconsin

Boring No. M4
 Surface Elevation (ft) 855.5±
 Job No. C13078
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N		Depth (ft)	qu (qa) (tsf)	W	LL	PL
					12 in. TOPSOIL (OL - FILL)					
1		18	M	14	FILL: Brown to Gray Lean Clay Intermixed with Sand and Gravel					
2		12	M	8	Loose, Black Organic SILT to PEAT (OL/PT)		45.0			10.9
3		10	M	4	Medium Stiff to Stiff, Gray Silty to Organic CLAY, Scattered Organics (CL-ML/OL)	(1.0)	27.4			
4		15	M	5		(0.75)				
					Loose, Brown Silty Fine SAND (SM)					
5		18	W	8						
					Medium Dense, Brown Fine to Medium SAND, Some Gravel, Little Silt (SP-SM)					
6		18	W	17						
					End Boring at 20 ft					
					Borehole backfilled with bentonite chips					

WATER LEVEL OBSERVATIONS	GENERAL NOTES
While Drilling <input checked="" type="checkbox"/> 13.5' Upon Completion of Drilling _____ Time After Drilling _____ Depth to Water _____ Depth to Cave in _____	Start <u>4/5/13</u> End <u>4/5/13</u> Driller <u>BSD</u> Chief <u>KD</u> Rig <u>ATV</u> Logger <u>MC</u> Editor <u>MNS</u> Drill Method <u>2 1/4" HSA</u>
The stratification lines represent the approximate boundary between soil types and the transition may be gradual.	



LOG OF TEST BORING

Project AEC Maintenance Building
Bram Street
 Location Madison, Wisconsin

Boring No. **M5**
 Surface Elevation (ft) 855±
 Job No. **C13078**
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	Rec (in.)	Moist	N	Depth (ft)		qu (qa) (tsf)	W	LL	PL	LI
				0	10 in. TOPSOIL (OL - FILL)					
1	18	M	13	13	FILL: Brown to Gray Lean Clay Intermixed with Sand and Gravel	(3.0)				
2	12	M	6	6						
				5						
3	18	W	12	12	Medium Dense, Gray-Brown Fine to Medium SAND, Some Gravel, Little Silt (SP-SM)					
4	18	W	15	15						
				10						
5	18	W	17	17						
				15						
					End Boring at 15 ft					
					Borehole backfilled with bentonite chips					
				20						
				25						

WATER LEVEL OBSERVATIONS

GENERAL NOTES

While Drilling ∇ 6.0' Upon Completion of Drilling _____
 Time After Drilling _____ **10 min.**
 Depth to Water _____ **6.0'** ∇
 Depth to Cave in _____ **10.0'**

Start 4/5/13 End 4/5/13
 Driller BSD Chief KD Rig ATV
 Logger MC Editor MNS
 Drill Method 2 1/4" HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.



LOG OF TEST BORING

Project AEC Maintenance Building
Bram Street
 Location Madison, Wisconsin

Boring No. M6
 Surface Elevation (ft) 854±
 Job No. C13078
 Sheet 1 of 1

2921 Perry Street, Madison, WI 53713 (608) 288-4100, FAX (608) 288-7887

SAMPLE					VISUAL CLASSIFICATION and Remarks	SOIL PROPERTIES				
No.	TYPE	Rec (in.)	Moist	N		Depth (ft)	qu (qa) (tsf)	W	LL	PL
					10 in. TOPSOIL (OL - FILL)					
1		10	M	8	FILL: Brown to Gray Lean Clay Intermixed with Sand and Gravel	(2.75)				
2		10	M	7	Loose, Black Organic SILT to PEAT (OL/PT)		74.3			
3		2	W	11	Medium Stiff to Stiff, Gray Silty to Organic CLAY, Scattered Organics (CL-ML/OL)	(0.75-1.0)				
4		18	W	31	Medium Dense to Dense, Brown Fine SAND, Little to Some Silt (SP-SM/SM)					
5		18	W	26						
					End Boring at 15 ft					
					Borehole backfilled with bentonite chips					

WATER LEVEL OBSERVATIONS

GENERAL NOTES

While Drilling 6.0' Upon Completion of Drilling _____
 Time After Drilling _____
 Depth to Water _____
 Depth to Cave in _____

Start 4/5/13 End 4/5/13
 Driller BSD Chief KD Rig ATV
 Logger MC Editor MNS
 Drill Method 2 1/4" HSA

The stratification lines represent the approximate boundary between soil types and the transition may be gradual.

LOG OF TEST BORING
General Notes

DESCRIPTIVE SOIL CLASSIFICATION

Grain Size Terminology

Soil Fraction	Particle Size	U.S. Standard Sieve Size
Boulders	Larger than 12"	Larger than 12"
Cobbles.....	3" to 12"	3" to 12"
Gravel: Coarse.....	¾" to 3"	¾" to 3"
Fine.....	4.76 mm to ¾"	#4 to ¾"
Sand: Coarse.....	2.00 mm to 4.76 mm.....	#10 to #4
Medium	0.42 to mm to 2.00 mm.....	#40 to #10
Fine.....	0.074 mm to 0.42 mm	#200 to #40
Silt.....	0.005 mm to 0.074 mm.....	Smaller than #200
Clay	Smaller than 0.005 mm	Smaller than #200

Plasticity characteristics differentiate between silt and clay.

General Terminology

Physical Characteristics
Color, moisture, grain shape, fineness, etc.
Major Constituents
Clay, silt, sand, gravel
Structure
Laminated, varved, fibrous, stratified, cemented, fissured, etc.
Geologic Origin
Glacial, alluvial, eolian, residual, etc.

Relative Density

Term "N" Value
Very Loose..... 0 - 4
Loose..... 4 - 10
Medium Dense.....10 - 30
Dense.....30 - 50
Very Dense.....Over 50

Relative Proportions Of Cohesionless Soils

Proportional Term	Defining Range by Percentage of Weight
Trace.....	0% - 5%
Little	5% - 12%
Some	12% - 35%
And.....	35% - 50%

Consistency

Term	q _u -tons/sq. ft
Very Soft.....	0.0 to 0.25
Soft.....	0.25 to 0.50
Medium.....	0.50 to 1.0
Stiff.....	1.0 to 2.0
Very Stiff.....	2.0 to 4.0
Hard.....	Over 4.0

Organic Content by Combustion Method

Soil Description	Loss on Ignition
Non Organic.....	Less than 4%
Organic Silt/Clay.....	4 - 12%
Sedimentary Peat.....	12% - 50%
Fibrous and Woody Peat...	More than 50%

Plasticity

Term	Plastic Index
None to Slight.....	0 - 4
Slight.....	5 - 7
Medium.....	8 - 22
High to Very High ..	Over 22

The penetration resistance, N, is the summation of the number of blows required to effect two successive 6" penetrations of the 2" split-barrel sampler. The sampler is driven with a 140 lb. weight falling 30" and is seated to a depth of 6" before commencing the standard penetration test.

SYMBOLS

Drilling and Sampling

- CS – Continuous Sampling
- RC – Rock Coring: Size AW, BW, NW, 2"W
- RQD – Rock Quality Designation
- RB – Rock Bit/Roller Bit
- FT – Fish Tail
- DC – Drove Casing
- C – Casing: Size 2 ½", NW, 4", HW
- CW – Clear Water
- DM – Drilling Mud
- HSA – Hollow Stem Auger
- FA – Flight Auger
- HA – Hand Auger
- COA – Clean-Out Auger
- SS - 2" Dia. Split-Barrel Sample
- 2ST – 2" Dia. Thin-Walled Tube Sample
- 3ST – 3" Dia. Thin-Walled Tube Sample
- PT – 3" Dia. Piston Tube Sample
- AS – Auger Sample
- WS – Wash Sample
- PTS – Peat Sample
- PS – Pitcher Sample
- NR – No Recovery
- S – Sounding
- PMT – Borehole Pressuremeter Test
- VS – Vane Shear Test
- WPT – Water Pressure Test

Laboratory Tests

- q_a – Penetrometer Reading, tons/sq ft
- q_a – Unconfined Strength, tons/sq ft
- W – Moisture Content, %
- LL – Liquid Limit, %
- PL – Plastic Limit, %
- SL – Shrinkage Limit, %
- LI – Loss on Ignition
- D – Dry Unit Weight, lbs/cu ft
- pH – Measure of Soil Alkalinity or Acidity
- FS – Free Swell, %

Water Level Measurement

- ▽ - Water Level at Time Shown
- NW – No Water Encountered
- WD – While Drilling
- BCR – Before Casing Removal
- ACR – After Casing Removal
- CW – Cave and Wet
- CM – Caved and Moist

Note: Water level measurements shown on the boring logs represent conditions at the time indicated and may not reflect static levels, especially in cohesive soils.

CGC, Inc.

Madison - Milwaukee

UNIFIED SOIL CLASSIFICATION SYSTEM

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART

COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)		
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)	
	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
	GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)	
	GM	Silty gravels, gravel-sand-silt mixtures
	GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)	
	SW	Well-graded sands, gravelly sands, little or no fines
	SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)	
	SM	Silty sands, sand-silt mixtures
	SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)		
SILTS AND CLAYS Liquid limit less than 50%	ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
	OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
	CH	Inorganic clays of high plasticity, fat clays
	OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS	PT	Peat and other highly organic soils

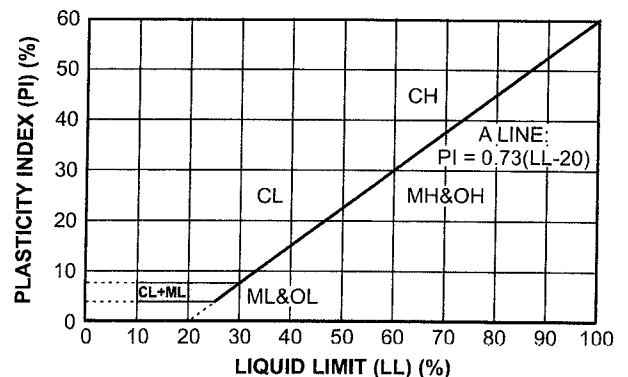
LABORATORY CLASSIFICATION CRITERIA

GW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
GP	Not meeting all gradation requirements for GW	
GM	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are borderline cases requiring use of dual symbols
GC	Atterberg limits above "A" line with P.I. greater than 7	
SW	$C_u = \frac{D_{60}}{D_{10}}$ greater than 4; $C_c = \frac{D_{30}}{D_{10} \times D_{60}}$ between 1 and 3	
SP	Not meeting all gradation requirements for GW	
SM	Atterberg limits below "A" line or P.I. less than 4	Limits plotting in shaded zone with P.I. between 4 and 7 are borderline cases requiring use of dual symbols.
SC	Atterberg limits above "A" line with P.I. greater than 7	

Determine percentages of sand and gravel from grain-size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size), coarse-grained soils are classified as follows:

Less than 5 percent GW, GP, SW, SP
 More than 12 percent GM, GC, SM, SC
 5 to 12 percent Borderline cases requiring dual symbols

PLASTICITY CHART



APPENDIX C

DOCUMENT QUALIFICATIONS

APPENDIX C DOCUMENT QUALIFICATIONS

I. GENERAL RECOMMENDATIONS/LIMITATIONS

CGC, Inc. should be provided the opportunity for a general review of the final design and specifications to confirm that earthwork and foundation requirements have been properly interpreted in the design and specifications. CGC should be retained to provide soil engineering services during excavation and subgrade preparation. This will allow us to observe that construction proceeds in compliance with the design concepts, specifications and recommendations, and also will allow design changes to be made in the event that subsurface conditions differ from those anticipated prior to the start of construction. CGC does not assume responsibility for compliance with the recommendations in this report unless we are retained to provide construction testing and observation services.

This report has been prepared in accordance with generally accepted soil and foundation engineering practices and no other warranties are expressed or implied. The opinions and recommendations submitted in this report are based on interpretation of the subsurface information revealed by the test borings indicated on the location plan. The report does not reflect potential variations in subsurface conditions between or beyond these borings. Therefore, variations in soil conditions can be expected between the boring locations and fluctuations of groundwater levels may occur with time. The nature and extent of the variations may not become evident until construction.

II. IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL ENGINEERING REPORT

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. *No one except you* should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one - not even you* - should apply the report for any purpose or project except the one originally contemplated.

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A GEOTECHNICAL ENGINEERING REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, *do not rely on a geotechnical engineering report* that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes - even minor ones - and request an assessment of their impact. *CGC cannot accept responsibility or liability for problems that occur because our reports do not consider developments of which we were not informed.*

SUBSURFACE CONDITIONS CAN CHANGE

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

MOST GEOTECHNICAL FINDINGS ARE PROFESSIONAL OPINION

Site exploration identifies subsurface conditions only at those points where surface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgement to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ - sometimes significantly - from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A REPORT'S RECOMMENDATIONS ARE NOT FINAL

Do not over-rely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgement and opinion, geotechnical engineers can finalize their recommendations only by observing actual subsurface conditions revealed during construction. *CGC cannot assume responsibility or liability for the report's recommendations if we do not perform construction observation.*

A GEOTECHNICAL ENGINEERING REPORT IS SUBJECT TO MISINTERPRETATION

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having CGC participate in prebid and preconstruction conferences, and by providing construction observation.

DO NOT REDRAW THE ENGINEER'S LOGS

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

GIVE CONTRACTORS A COMPLETE REPORT AND GUIDANCE

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

READ RESPONSIBILITY PROVISIONS CLOSELY

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce such risks, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes

labeled "limitations," many of these provisions indicate where geotechnical engineer's responsibilities begin and end, to help others recognize their own responsibilities and risks. Read these provisions closely. Ask questions. Your geotechnical engineer should respond fully and frankly.

GEOENVIRONMENTAL CONCERNS ARE NOT COVERED

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

OBTAIN PROFESSIONAL ASSISTANCE TO DEAL WITH MOLD

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

RELY ON YOUR GEOTECHNICAL ENGINEER FOR ADDITIONAL ASSISTANCE

Membership in ASFE exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with CGC, a member of ASFE, for more information.

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ASFE/The Best People on Earth
881 Colesville Road, Suite G 106
Silver Spring, MD 20910

APPENDIX D

RECOMMENDED COMPACTED FILL SPECIFICATIONS

APPENDIX D

CGC, INC.

RECOMMENDED COMPACTED FILL SPECIFICATIONS

General Fill Materials

Proposed fill shall contain no vegetation, roots, topsoil, peat, ash, wood or any other non-soil material which by decomposition might cause settlement. Also, fill shall never be placed while frozen or on frozen surfaces. Rock, stone or broken concrete greater than 6 in. in the largest dimension shall not be placed within 10 ft of the building area. Fill used greater than 10 ft beyond the building limits shall not contain rock, boulders or concrete pieces greater than a 2 sq ft area and shall not be placed within the final 2 ft of finish subgrade or in designated utility construction areas. Fill containing rock, boulders or concrete pieces should include sufficient finer material to fill voids among the larger fragments.

Special Fill Materials

In certain cases, special fill materials may be required for specific purposes, such as stabilizing subgrades, backfilling undercut excavations or filling behind retaining walls. For reference, WisDOT gradation specifications for various types of granular fill are attached in Table 1.

Placement Method

The approved fill shall be placed, spread and leveled in layers generally not exceeding 10 in. in thickness before compaction. The fill shall be placed at a moisture content capable of achieving the desired compaction level. For clay soils or granular soils containing an appreciable amount of cohesive fines, moisture conditioning will likely be required.

It is the Contractor's responsibility to provide all necessary compaction equipment and other grading equipment that may be required to attain the specified compaction. Hand-guided vibratory or tamping compactors will be required whenever fill is placed adjacent to walls, footings, columns or in confined areas.

Compaction Specifications

Maximum dry density and optimum moisture content of the fill soil shall be determined in accordance with modified Proctor methods (ASTM D1557). The recommended field compaction as a percentage of the maximum dry density is shown in Table 2. Note that these compaction guidelines would generally not apply to coarse gravel/stone fill. Instead, a method specification would apply (e.g., compact in thin lifts with a vibratory compactor until no further consolidation is evident).

Testing Procedures

Representative samples of proposed fill shall be submitted to CGC, Inc. for optimum moisture-maximum density determination (ASTM D1557) prior to the start of fill placement. The sample size should be approximately 50 lb.

CGC, Inc. shall be retained to perform field density tests to determine the level of compaction being achieved in the fill. The tests shall generally be conducted on each lift at the beginning of fill placement and at a frequency mutually agreed upon by the project team for the remainder of the project.

**Table 1
Gradation of Special Fill Materials**

Material	WisDOT Section 311	WisDOT Section 312	WisDOT Section 305			WisDOT Section 209		WisDOT Section 210
	Breaker Run	Select Crushed Material	3-in. Dense Graded Base	1 1/4-in. Dense Graded Base	3/4-in. Dense Graded Base	Grade 1 Granular Backfill	Grade 2 Granular Backfill	Structure Backfill
Sieve Size	Percent Passing by Weight							
6 in.	100							
5 in.		90-100						
3 in.			90-100					100
1 1/2 in.		20-50	60-85					
1 1/4 in.				95-100				
1 in.					100			
3/4 in.			40-65	70-93	95-100			
3/8 in.				42-80	50-90			
No. 4			15-40	25-63	35-70	100 (2)	100 (2)	25-100
No. 10		0-10	10-30	16-48	15-55	75 (2)		
No. 40			5-20	8-28	10-35	15 (2)	30 (2)	
No. 200			2-12	2-12	5-15	8 (2)	15 (2)	15 (2)

Notes:

1. Reference: Wisconsin Department of Transportation *Standard Specifications for Highway and Structure Construction*.
2. Percentage applies to the material passing the No. 4 sieve, not the entire sample.
3. Per WisDOT specifications, both breaker run and select crushed material can include concrete that is 'substantially free of steel, building materials and other deleterious material'.

**Table 2
Compaction Guidelines**

Area	Percent Compaction (1)	
	Clay/Silt	Sand/Gravel
Within 10 ft of building lines		
Footing bearing soils	93 - 95	95
Under floors, steps and walks		
- Lightly loaded floor slab	90	90
- Heavily loaded floor slab and thicker fill zones	92	95
Beyond 10 ft of building lines		
Under walks and pavements		
- Less than 2 ft below subgrade	92	95
- Greater than 2 ft below subgrade	90	90
Landscaping	85	90

Notes:

1. Based on Modified Proctor Dry Density (ASTM D 1557)

APPENDIX E

WI DEPT. OF SPS SOIL EVALUATION FORMS (4 BOIRNGS)

SOIL EVALUATION - STORM

in accordance with Comm 82.365 & 85, Wis. Adm. Code

Attach complete site plan on paper not less than 8 1/2 x 11 inches in size. Plan must include, but not limited to: vertical and horizontal reference point (BM), direction and percent slope, scale or dimensions, north arrow, and BM referenced to nearest road.

Please print all information.

Personal information you provide may be used for secondary purposes (Privacy Law, s. 15.04 (1) (m)).

County	Dane
Parcel I.D.	032/0709-253-9000-5
Review by	Date

Property Owner Dane County Coliseum				Property Location Govt. Lot SW 1/4 SW 1/4 S 25 T 07 N R 9 E			
Property Owner's Mailing Address 1881 E. Expo Mall				Lot #	Block #	Subd. Name or CSM#	
City	State	Zip Code	Phone Number	<input checked="" type="checkbox"/> City	<input type="checkbox"/> Village	<input type="checkbox"/> Town	Nearest Road
Madison	WI	53713		Madison	Alliant Energy Center Way		

Drainage area: <u>2.63</u> <input type="checkbox"/> sq. ft. <input checked="" type="checkbox"/> acres	Hydraulic Application Test Method
Optional: Test Site Suitable for (check all that apply)	<input checked="" type="checkbox"/> Morphological Evaluation
<input type="checkbox"/> Irrigation <input type="checkbox"/> Bioretention trench <input type="checkbox"/> Trench(es)	<input type="checkbox"/> Double-Ring Infiltrometer
<input type="checkbox"/> Rain Garden <input type="checkbox"/> Grassed Swale <input type="checkbox"/> Reuse	<input type="checkbox"/> Other (Specify) _____
<input type="checkbox"/> Infiltration trench <input type="checkbox"/> SDS (>15' wide) <input type="checkbox"/> Other _____	

7 Obs. # Boring Pit
Ground Surface Elev. 858 ± ft Depth to limiting factor 105 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate
									Inches/Hr
1	0-12	--	--	PVMT	--	--	--	--	--
2	12-66	2.5Y4/3	None	FILL: SL/SICL	0sg	mlo	CW	20-30	0.04
3	66-105	5YR2/1	None	CL	1fsbk	mfi	CW	<5	0.03
4	105-132	5BG5/1	C2F 4Y2/1	SIC	2fsbk	mefi	CW	<5	0.07
5	132-240	5Y3/3	None	LFS	0sg	mfr		<5	0.50
Groundwater observed @ 9.5 ft 1 hour after drilling.									

8 Obs. # Boring Pit
Ground Surface Elev. 856 ± ft Depth to limiting factor 90 in.

Horizon	Depth in.	Dominant Color Munsell	Redox Description Qu. Sz. Cont. Color	Texture	Structure Gr. Sz. Sh.	Consistence	Boundary	% Rock Frag.	Hydraulic App. Rate
									Inches/Hr
1	0-6	10YR2/2	None	FILL: CL	1fsbk	mfr	AS	<5	0.03
2	6-36	10YR3/2	None	FILL: CL	1fsbk	mfi	CW	<5	0.03
3	36-66	10YR2/1	None	CL	2fsbk	mfr	CW	<5	0.03
4	66-162	5YR4/4	None	SL	0sg	mlo	CW	<5	0.50
5	162-240	5YR4/4 & 5BG5/1	--	LFS	0sg	mlo	--	<5	0.50
Groundwater observed @ 7.5 ft 1 hour after drilling.									

CST/PSS Name (Please Print) Nathan I. Springstead, CST	Signature <i>Nathan Springstead</i>	CST Number 1091739
Address 336 S. Curtis Road, West Allis, WI 53214	Date Evaluation Conducted 4/10/2013	Telephone Number (414) 443-2000

Name of Bidding Firm: _____

BID FORM

BID NO. 313072

**PROJECT: ALLIANT ENERGY CENTER PAVILIONS
ALLIANT ENERGY CENTER**

**TO: DANE COUNTY DEPARTMENT OF PUBLIC WORKS, HIGHWAY &
TRANSPORTATION PROJECT ENGINEER
1919 ALLIANT ENERGY CENTER WAY
MADISON, WISCONSIN 53713**

BASE BID - LUMP SUM:

Construction of the new Alliant Energy Center Pavilions to include demolition of barn structures, site development, and building of two Pavilion buildings. Pavilion 1 will include a 2-story Pre-function conventional structure, while the remainder of the facility will feature pre-engineered metal frame construction. Pavilion 1 will be a heated facility. Pavilion 2 will be an un-heated structure and have a pre-engineered metal frame. There will be a shed roofed metal frame building on one end of Pavilion 2 that will serve as a maintenance facility. The entire project from demolition to substantial completion must occur between April 14, 2014 and September 19, 2014 to allow the Alliant Energy Center to honor contracted events .

The undersigned agrees to add the allowance (for additional Information Technology beyond Work included in the Construction Documents), alternate(s), unit prices, informational bid portions of the Work as described, for the following addition(s) to or subtraction(s) from the Base Bid, as stipulated below on the Bid Form and to provide a Lump Sum Allowance for Information Technology in the Base Bid.

The undersigned, having examined the site where the Work is to be executed and having become familiar with local conditions affecting the cost of the Work and having carefully examined the Drawings and Specifications, all other Construction Documents and Addenda thereto prepared by Dane County Department of Public Works, Highway & Transportation hereby agrees to provide all expertise labor, materials, equipment and services necessary for the complete and satisfactory execution of the entire Work, as specified in the Construction Documents, for the Base Bid stipulated sum of:

_____ and _____ /100 Dollars
Written Price

\$ _____
Numeric Price

LUMP SUM ALLOWANCE FOR ADDITIONAL INFORMATION TECHNOLOGY (IT)

Provide a lump sum allowance to be included in the Base Bid of One Hundred and Fifty Thousand Dollars (\$150,000.00) . The allowance will be used for active IT network equipment in addition to the fiber and copper backbone cabling, patch panels and support and pathway systems which are included in the Construction Documents.

Include Lump Sum Allowance in Base Bid for Active IT Network Equipment:

One Hundred and Fifty Thousand and 00 /100 Dollars
Written Price

\$150,000.00
Numeric Price

ALTERNATE BID 1: INTERIOR BUILD-OUT OF TOILETS - LUMP SUM:

Add price for providing interior build-out of Family Toilet 134, Janitor 135, Women’s Toilet 136, and Men’s Toilet 137. This alternate incudes all above slab work including but not limited to; plumbing fixtures, CMU wall assemblies, light gage metal ceiling assemblies, interior finishes, specialties, mechanical and electrical equipment. Refer to the drawings for further clarifications.

_____ and _____ /100 Dollars
Written Price

\$
Numeric Price (circle: Add or Deduct)

ALTERNATE BID 2: INTERIOR BUILD-OUT OF MEZZANINE LEVEL - LUMP SUM:

Add price for providing interior build-out option for Mezzanine level in Areas A & B of Pavilion #1 (as indicated in the drawings).

_____ and _____ /100 Dollars
Written Price

\$
Numeric Price (circle: Add or Deduct)

ALTERNATE BID 3: AREA F - LUMP SUM:

Add price for providing construction of the storage building on the west side of Pavilion # 2 (as indicated in the drawings).

_____ and _____ /100 Dollars
Written Price

\$
Numeric Price (circle: Add or Deduct)

ALTERNATE BID 4: CONCRETE SLAB-ON-GRADE REINFORCING:

Deduct price regarding reinforcing in concrete slabs-on-grade to provide fiber mesh reinforcing in lieu of wire mesh in slabs, unless noted otherwise.

_____ and _____ /100 Dollars
Written Price

\$
Numeric Price (circle: Add or Deduct)

ALTERNATE BID 5: INTERIOR BUILDOUT FOR AREA E - LUMP SUM:

Deduct price for deleting all Work associated with the interior build-out the maintenance shop building on the west side of Pavilion # 2 (as indicated in the drawings). Floor slab and under floor systems are to remain in the overall the scope of Work and are not to be included in the deleted price.

_____ and _____ /100 Dollars
Written Price

\$ _____
Numeric Price (circle: Add or Deduct)

ALTERNATE BID 6: HVAC CONTROL – SIEMANS - LUMP SUM:

Price for Siemans HVAC control system as described in Specification Section 23 09 23 Direct Digital Control (DDC) Systems in lieu of the specified manufacturer and system.

_____ and _____ /100 Dollars
Written Price

\$ _____
Numeric Price (circle: Add or Deduct)

ALTERNATE BID 7: HVAC CONTROL – HONEYWELL - LUMP SUM:

Price for Honeywell HVAC control system as described in Specification Section 23 09 23 Direct Digital Control (DDC) Systems in lieu of the specified manufacturer and system.

_____ and _____ /100 Dollars
Written Price

\$ _____
Numeric Price (circle: Add or Deduct)

UNIT PRICING: UNIT PRICE 1, REMOVAL OF SOIL:

Add price for removal of unsuitable soil and replace with engineered fill where soil testing agency has determined existing conditions are insufficient for the purposes of the project (refer to section 31 20 00 - Earthmoving.).

Unsuitable Soil Removal and Replacement With Engineered Fill:

- 500 cu. yds. or less: @ \$ _____ /cu. yd.
- 500 cu. yds. or greater: @ \$ _____ /cu. yd.

INFORMATIONAL BID 1: GREASE INTERCEPTORS - LUMP SUM:

Bid for providing grease interceptors to the concession area in Pavilion # 1.

_____ and _____ /100 Dollars
Written Price

\$ _____
Numeric Price (circle: Add or Deduct)

INFORMATIONAL BID 2: GREASE HOOD MAKE-UP AIR SYSTEM - LUMP SUM:

Bid for providing a grease hood makeup-air system in the concession area of Pavilion # 1.

_____ and _____ /100 Dollars
Written Price

\$ _____
Numeric Price (circle: Add or Deduct)

DIRECT PURCHASE OF MATERIALS & EQUIPMENT BY COUNTY

The amount of materials and equipment that individually exceeds Five Thousand Dollars (\$5,000), to be purchased by the County that is included in the above base price (including tax).

Direct Owner Purchase Value:

_____ and _____ /100 Dollars
Written Price

\$ _____
Numeric Price

ACKNOWLEDGEMENT OF ADDENDUM:

Receipt of the following addenda and inclusion of their provisions in this Bid is hereby acknowledged:

Addendum No(s). _____ through _____

Dated _____

TIMETABLE / COMPLETION DATES:

Dane County Department of Public Works, Highway & Transportation must have the entire project from demolition to occupancy permit completed between April 14, 2014 and September 19, 2014 to allow the Alliant Energy Center to honor contracted events.

Assuming this Work can be started by April 14, 2014, what dates can you commence and complete this job?

Commencement Date: _____ Completion Date: _____
(substantial for Midwest Horse Fair)

Completion Date: _____
(final completion of Pavilions project)

CERTIFICATION OF STATEMENTS:

I hereby certify that all statements herein are made on behalf of:

(Name of Corporation, Partnership or Person submitting Bid)

Select one of the following:

1. A corporation organized and existing under the laws of the State of _____, or

2. A partnership consisting of _____, or

3. A person conducting business as _____;

Of the City, Village, or Town of _____ of the State of _____.

I have examined and carefully prepared this Bid from the associated Construction Documents and have checked the same in detail before submitting this Bid; that I have full authority to make such statements and submit this Bid in (its) (their) (my) behalf; and that the said statements are true and correct. In signing this Bid, we also certify that we have not, either directly or indirectly, entered into any agreement or participated in any collusion or otherwise taken any action in restraint of free competition; that no attempt has been made to induce any other person or firm to submit or not to submit a Bid; that this Bid has been independently arrived at without collusion with any other bidder, competitor, or potential competitor; that this Bid has not been knowingly disclosed prior to the Bids Due Date to another bidder or competitor; that the above statement is accurate under penalty of perjury.

The undersigned further agrees to honor the Base Bid and the Alternate Bid(s) for 60 days from date of Award of Contract.

SIGNATURE: _____
(Bid is invalid without signature)

Print Name: _____ Date: _____

Title: _____

Address: _____

Telephone No.: _____ Fax No.: _____

Email Address: _____

Contact Person: _____

THIS PAGE IS FOR BIDDERS' REFERENCE AND NEED NOT BE SUBMITTED WITH BID FORM.

BID CHECK LIST:

These items **must** be included with Bid:

Bid Form

Bid Bond

Fair Labor Practices Certification

BIDDERS SHOULD BE AWARE OF THE FOLLOWING:

DANE COUNTY VENDOR REGISTRATION PROGRAM

Any person bidding on any County contract must be registered with the Dane County Purchasing Division & pay an annual registration fee. A contract will not be awarded to an unregistered vendor. Obtain a *Vendor Registration Form* by calling 608/266-4131 or complete a new form or renewal online at:

www.danepurchasing.com/registration

DANE COUNTY BEST VALUE CONTRACTING PRE-QUALIFICATION

Contractors must be pre-qualified as a Best Value Contractor with the Dane County Public Works Engineering Division before the award of contract. Obtain a *Best Value Contracting Application* by calling 608/266-4018 or complete one online at:

www.countyofdane.com/pwht/BVC_Application.aspx

EQUAL BENEFITS REQUIREMENT

By submitting a Bid, the contractor acknowledges that a condition of this contract is to provide equal benefits as required by Dane County Code of Ordinances Chapter 25.016. Contractor shall provide equal benefits as required by that Ordinance to all required employees during the term of the contract. Equal Benefits Compliance Payment Certification shall be submitted with final pay request. For more information:

www.danepurchasing.com/partner_benefit.aspx

FAIR LABOR PRACTICES CERTIFICATION

The undersigned, for and on behalf of the BIDDER, APPLICANT or PROPOSER named herein, certifies as follows:

- A. That he or she is an officer or duly authorized agent of the above-referenced BIDDER, APPLICANT or PROPOSER, which has a submitted a proposal, bid or application for a contract with the county of Dane.

- B. That BIDDER, APPLICANT or PROPOSER has (check one):

_____ not been found by the National Labor Relations Board (“NLRB”) or the Wisconsin Employment Relations Commission (“WERC”) to have violated any statute or regulation regarding labor standards or relations in the seven years prior to the signature date of this Certification.

_____ been found by the National Labor Relations Board (“NLRB”) or the Wisconsin Employment Relations Commission (“WERC”) to have violated any statute or regulation regarding labor standards or relations in the seven years prior to the signature date of this Certification.

Officer or Authorized Agent Signature

Date

Printed or Typed Name and Title

Printed or Typed Business Name

NOTE: You can find information regarding the violations described above at: www.nlrb.gov and werc.wi.gov.

For reference, Dane County Ordinance 25.11(28)(a) is as follows:

(28) BIDDER RESPONSIBILITY. (a) Any bid, application or proposal for any contract with the county, including public works contracts regulated under chapter 40, shall include a certification indicating whether the bidder has been found by the National Labor Relations Board (NLRB) or the Wisconsin Employment Relations Committee (WERC) to have violated any statute or regulation regarding labor standards or relations within the last seven years. The purchasing manager shall investigate any such finding and make a recommendation to the committee, which shall determine whether the conduct resulting in the finding affects the bidder’s responsibility to perform the contract.

If you indicated that the NLRB or WERC have found you to have such a violation, you must include copies of any relevant information regarding such violation with your proposal, bid or application.

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DANE COUNTY DEPARTMENT of PUBLIC WORKS, HIGHWAY and TRANSPORTATION

County Executive
Joseph T. Parisi

1919 Alliant Energy Center Way ♦ Madison, Wisconsin 53713
Phone: (608) 266-4018 ♦ FAX: (608) 267-1533

Commissioner / Director
Gerald J. Mandli

BEST VALUE CONTRACTING APPLICATION

CONTRACTORS / LICENSURE APPLICANTS

The Dane County Department of Public Works requires all contractors to be pre-qualified as a best value contractor with the County prior to being awarded a contract. In addition, the County pre-qualifies potential contractors and sub-contractors who wish to work on County contracts. Subcontractors must become pre-qualified ten (10) days prior to commencing work under any Dane County Public Works Contract. Potential subcontractors are urged to become pre-qualified as early as possible. This document shall be completed, properly executed, along with the necessary attachments and additional information that the County requires for the protection and welfare of the public in the performance of a County contract.

Contractors or subcontractors of any tier who attain pre-qualification status will retain that status for a period of two (2) years from the date of qualification. Contractors shall notify the Dane County Department of Public Works, Highway & Transportation within fifteen (15) days of any changes to its business or operations that are relevant to the pre-qualification application. Failure to do so could result in suspension, revocation of the contractor's pre-qualification, debarment from County contracts for up to three (3) years and / or other sanctions available under the law.

No contracts will be awarded for construction work performed on Dane County projects unless the contractor is currently approved as a Wisconsin Trade Trainer or has applied for approval as an Apprenticeship Trade Trainer to the Wisconsin Department of Workforce Development and agrees to an acceptable apprenticeship program. If you are not currently approved as a Wisconsin Trade Trainer, or have not applied for approval as an Apprenticeship Trade Trainer, please contact the Department of Workforce Development - Bureau of Apprenticeship Standards at 608/266-3133 or visit their web site at: dwd.wisconsin.gov/apprenticeship/.

EXEMPTIONS

- Contractors who employ less than five (5) apprenticeable trade workers are not required to pre-qualify.
- Contractors performing work that does not apply to an apprenticeable trade, as outlined in Appendix A.
- The contractor / subcontractor provides sufficient documentation to demonstrate one or more of the following:
 - apprentices are not available in a specific geographic area;
 - the applicable apprenticeship program is unsuitable or unavailable; or
 - there is a documented depression of the local construction market which prevents compliance.

SEC.	PROOF OF RESPONSIBILITY	CHECK IF APPLICABLE
1	Does your firm possess all technical qualifications and resources, including equipment, personnel and financial resources, necessary to perform the work required for any project or obtain the same through the use of responsible, pre-qualified subcontractors?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
2	Will your firm possess all valid, effective licenses, registrations or certificates required by federal, state, county, or local law, which are necessary for the type of work to be performed including, but not limited to, those for any type of trade work or specialty work?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
3	Will your firm meet all bonding requirements as required by applicable law or contract specifications?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
4	Will your firm meet all insurance requirements as required by applicable law or specifications, including general liability insurance, workers compensation insurance and unemployment insurance requirements?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
5	Will your firm maintain a substance abuse policy for employees hired for public works contracts that comply with Wis. Stats. Sec. 103.503?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
6	Does your firm acknowledge that it must pay all craft employees on public works projects the wage rates and benefits required under Section 66.0903 of the Wisconsin Statutes?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
7	Will your firm fully abide by the equal opportunity and affirmative action requirements of all applicable laws, including County ordinances?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
8	In the past three (3) years, has your firm had control or has another corporation, partnership or other business entity operating in the construction industry controlled it? If so, please attach a statement explaining the nature of the firm relationship?	Yes: <input type="checkbox"/> No: <input type="checkbox"/> If Yes, attach details.
9	In the past three (3) years, has your firm had any type of business, contracting or trade license, certification or registration revoked or suspended?	Yes: <input type="checkbox"/> No: <input type="checkbox"/> If Yes, attach details.
10	In the past three (3) years, has your firm been debarred by any federal, state or local government agency?	Yes: <input type="checkbox"/> No: <input type="checkbox"/> If Yes, attach details.
11	In the past three (3) years, has your firm defaulted or failed to complete any contract?	Yes: <input type="checkbox"/> No: <input type="checkbox"/> If Yes, attach details.
12	In the past three (3) years, has your firm committed a willful violation of federal, state or local government safety laws as determined by a final decision of a court or government agency authority.	Yes: <input type="checkbox"/> No: <input type="checkbox"/> If Yes, attach details.
13	In the past three (3) years, has your firm been in violation of any law relating to your contracting business where the penalty for such violation resulted in the imposition of a penalty greater than \$10,000?	Yes: <input type="checkbox"/> No: <input type="checkbox"/> If Yes, attach details.
14	Is your firm Executive Order 108 precertified with the State of Wisconsin?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
15	Is your firm an active Wisconsin Trade Trainer as determined by the Wisconsin Bureau of Apprenticeship Standards?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
16	Is your firm exempt from being pre-qualified with Dane County?	Yes: <input type="checkbox"/> No: <input type="checkbox"/> If Yes, attach reason for exemption.
17	Does your firm acknowledge that in doing work under any County Public Works Contract, it will be required to use as subcontractors only those contractors that are also pre-qualified with the County or become so ten days prior to commencing work?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
18	Contractor has been in business less than one year?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
19	Is your firm a first time Contractor requesting a one time exemption, but, intend to comply on all future contracts and are taking steps typical of a "good faith" effort?	Yes: <input type="checkbox"/> No: <input type="checkbox"/>
20	Not applicable. My firm does not intend to work on Best Value Contracts. Note: Best Value Contracting is required to bid on most Public Works Contracts (if unclear, please call Jan Neitzel Knox 608-266-4029).	Yes: <input type="checkbox"/> No: <input type="checkbox"/>

SIGNATURE SECTION

Your firm's Officer, or the individual who would sign a bid and / or contract documents must sign this document.

I do hereby certify that all statements herein contained are true and correct to the best of my knowledge:

Signature

Date

Printed or Typed Name and Title

NAME AND ADDRESS OF CONTRACTOR	
Name of Firm:	
Address:	
City, State, Zip:	
Telephone Number:	
Fax Number:	
E-mail Address:	

REMEMBER!

Return all to forms and attachments, or questions to:

JAN NEITZEL KNOX
EMAIL: NEITZEL-KNOX@COUNTYOFDANE.COM
OFFICE: (608)266-4029, FAX: (608)267-1533

**DANE COUNTY DEPARTMENT OF PUBLIC WORKS,
HIGHWAY & TRANSPORTATION
1919 ALLIANT ENERGY CENTER WAY
MADISON, WI 53713**

APPENDIX A

APPRENTICEABLE TRADES

Bricklayer
Carpenter
Cement Mason (Concrete Finisher)
Cement Mason (Heavy Highway)
Construction Craft Laborer
Data Communications Installer
Electrician
Elevator Mechanic / Technician
Environmental Systems Technician / HVAC Service Technician / HVAC Install & Service
Glazier
Heavy Equipment Operator / Operating Engineer
Insulation Worker (Heat & Frost)
Iron Worker (Assembler, Metal Buildings)
Painter / Decorator
Plasterer
Plumber
Roofer / Waterproofer
Sheet Metal Worker
Sprinkler Fitter
Steamfitter (Service & Refrigeration)
Taper & Finisher
Telecommunications (Voice, Data & Video) Installer / Technician
Tile Setter

COUNTY OF DANE

PUBLIC WORKS CONSTRUCTION CONTRACT

Contract No. _____ Bid No. 313072

Authority: Res. _____, 2013-14

THIS CONTRACT, made and entered into as of the date by which authorized representatives of both parties have affixed their signatures, by and between the County of Dane (hereafter referred to as "COUNTY") and _____ (hereafter, "CONTRACTOR"), and

WITNESSETH:

WHEREAS, COUNTY, whose address is c/o Assistant Public Works Director, 1919 Alliant Energy Center Way, Madison, WI 53713, desires to have CONTRACTOR provide the Alliant Energy Center Pavilions Project , including Alternate Bids listed in the Bid Form, ("the Project"); and

WHEREAS, CONTRACTOR, whose address is _____ is able and willing to construct the Project, in accordance with the Construction Documents;

NOW, THEREFORE, in consideration of the above premises and the mutual covenants of the parties hereinafter set forth, the receipt and sufficiency of which is acknowledged by each party for itself, COUNTY and CONTRACTOR do agree as follows:

1. CONTRACTOR agrees to construct, for the price of \$_____ the Project and at the CONTRACTOR'S own proper cost and expense to furnish all materials, supplies, machinery, equipment, tools, superintendence labor, insurance, and other accessories and services necessary to complete the Project in accordance with the conditions and prices stated in the Bid Form, General Conditions of Contract, the drawings which include all maps, plats, plans, and other drawings and printed or written explanatory matter thereof, and the specifications therefore as prepared by Strang, Inc. (hereinafter referred to as "the Architect / Engineer"), and as enumerated in the Project Manual Document Index, all of which are made a part hereof and collectively evidence and constitute the Contract.

2. COUNTY agrees to pay the CONTRACTOR in current funds for the performance of the Contract subject to additions and deductions, as provided in the General Conditions of Contract, and to make payments on account thereof as provided in Article entitled, "Payments to Contractor" of the General Conditions of Contract.

3. During the term of this Contract, CONTRACTOR agrees to take affirmative action to ensure equal employment opportunities. The CONTRACTOR agrees in accordance with Wisconsin Statute 111.321 and Chapter 19 of the Dane County Code of Ordinances not to discriminate on the basis of age, race, ethnicity, religion, color, gender, disability, marital status, sexual orientation, national origin, cultural differences, ancestry, physical appearance, arrest record or conviction record, military participation or membership in the national guard, state defense force or any other reserve component of the military forces of the United States, or political beliefs.

Such equal opportunity shall include, but not be limited to, the following: employment, upgrading, demotion, transfer, recruitment, advertising, layoff, termination, training, rates of pay, and any other form of compensation. CONTRACTOR agrees to post in conspicuous places, available to all employees and applicants for employment, notices setting forth the provisions of this paragraph.

4. CONTRACTOR shall file an Affirmative Action Plan with the Dane County Contract Compliance Officer in accord with Chapter 19 of the Dane County Code of Ordinances. CONTRACTOR must file such plan within fifteen (15) days of the effective date of this Contract. During the term of this Contract CONTRACTOR shall also provide copies of all announcements of employment opportunities to COUNTY'S Contract Compliance Office, and shall report annually the number of persons, by race, ethnicity, gender, and disability status, which apply for employment and, similarly classified, the number hired and number rejected.

5. During the term of this Contract, all solicitations for employment placed on CONTRACTOR'S behalf shall include a statement to the effect that CONTRACTOR is an "Equal Opportunity Employer."

6. CONTRACTOR agrees to comply with provisions of Chapter 25.016 of the Dane County Code of Ordinances, which pertains to domestic partnership benefits.

7. CONTRACTOR agrees to furnish all information and reports required by COUNTY'S Contract Compliance Officer as the same relate to affirmative action and nondiscrimination, which may include any books, records, or accounts deemed appropriate to determine compliance with Chapter 19, Dane County Code of Ordinances, and the provisions of this Contract.

8. CONTRACTOR agrees that all persons employed by CONTRACTOR or any subcontractor shall be paid no less than the minimum wage established under Chapter 40, Subchapter II, Dane County Code of Ordinances. CONTRACTOR agrees to abide by and comply with the provisions of Chapter 40, Subchapter II of the Dane County Code of Ordinances, and said Subchapter is fully incorporated herein by reference.

9. This Contract is intended to be a Contract solely between the parties hereto and for their benefit only. No part of this Contract shall be construed to add to, supplement, amend, abridge or repeal existing rights, benefits or privileges of any third party or parties including, but not limited to, employees of either of the parties.

10. The entire agreement of the parties is contained herein and this Contract supersedes any and all oral agreements and negotiations between the parties relating to the subject matter hereof. The parties expressly agree that the express terms of this Contract shall not be amended in any fashion except in writing, executed by both parties.

11. CONTRACTOR must be pre-qualified as a Best Value Contractor with Dane County Public Works Engineering Division before award of Contract. Subcontractors must be pre-qualified ten (10) days prior to commencing Work under this Contract.

IN WITNESS WHEREOF, COUNTY and CONTRACTOR, by their respective authorized agents, have caused this Contract and its Schedules to be executed, effective as of the date by which all parties hereto have affixed their respective signatures, as indicated below.

* * * * *

FOR CONTRACTOR:

Signature Date

Printed or Typed Name and Title

Signature Date

Printed or Typed Name and Title

NOTE: If CONTRACTOR is a corporation, Secretary should attest. In accordance with IRS Regulations, unincorporated entities are required to provide either their Social Security or Employer Number in order to receive payment for services rendered.

* * * * *

This Contract is not valid or effectual for any purpose until approved by the appropriate authority designated below, and no work is authorized until the CONTRACTOR has been given notice to proceed by COUNTY'S Assistant Public Works Director.

FOR COUNTY:

Joseph T. Parisi, County Executive Date

Scott McDonell, County Clerk Date

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THE AMERICAN INSTITUTE OF ARCHITECTS



AIA Document A310

Bid Bond

Bond No.

KNOW ALL MEN BY THESE PRESENTS, that we (Here insert full name and address or legal title of Contractor)

as Principal, hereinafter called the Principal, and (Here insert full name and address or legal title of Surety)

a corporation duly organized under the laws of the State of WI as Surety, hereinafter called the Surety, are held and firmly bound unto (Here insert full name and address or legal title of Owner)

as Obligee, hereinafter called Obligee, in the sum of () Percent of total amount bid Dollars (\$) Percent of attached bid.

For the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for Project No.: (Here insert full name, address, and description of project)

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

Signed and sealed this day of , 20 .

(Principal) (Seal)
(Witness)
(Title)
(Surety) (Seal)
(Witness)
ATTORNEY-IN-FACT

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THE AMERICAN INSTITUTE OF ARCHITECTS



Bond No. _____

AIA Document A312

Performance Bond

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address): _____

SURETY (Name and Principal Place of Business): _____

OWNER (Name and Address): _____

CONSTRUCTION CONTRACT
Date: _____
Amount: \$ _____
Description (Name and Location): _____

BOND

Date (Not earlier than Construction Contract Date): _____

Amount: \$ _____

Modifications to this Bond: _____

None

See Page 3

CONTRACTOR AS PRINCIPAL
COMPANY: _____
(Corporate Seal)

SURETY COMPANY: _____
(Corporate Seal)

Signature: _____
Name and Title:

Signature: _____
Name and Title:

Attorney-in-Fact

(Any additional signatures appear on page 3)

FOR INFORMATION ONLY-Name, Address and Telephone
AGENT OR BROKER: _____

OWNER'S REPRESENTATIVE (Architect,
Engineer or other party): _____

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

2. If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except to participate in conferences as provided in Subparagraph 3.1.

3. If there is no Owner Default, the Surety's obligation under this Bond shall arise after:

3.1 The Owner has notified the Contractor and the Surety at its address described in Paragraph 10 below that the Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held not later than fifteen days after receipt of such notice to discuss methods of performing the Construction Contract. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default; and

3.2 The Owner has declared a Contractor Default and formally terminated the Contractor's right to complete the contract. Such Contractor Default shall not be declared earlier than twenty days after the Contractor and the Surety have received notice as provided in Subparagraph 3.1; and

3.3 The Owner has agreed to pay the Balance of the Contract Price to the Surety in accordance with the terms of the Construction Contract or to a contractor selected to perform the Construction Contract in accordance with the terms of the contract with the Owner.

4. When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

4.1 Arrange for the Contractor, with consent of the Owner, to perform and complete the Construction Contract; or

4.2 Undertake to perform and complete the Construction Contract itself, through its agents or through independent contractors; or

4.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and the contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by the Owner resulting from the Contractor's default; or

4.4 Waive its rights to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

1. After investigation, determine the amount for

which it may be liable to the Owner and, as soon as practicable after the amount is determined, tender payment therefor to the Owner; or

2. Deny liability in whole or in part and notify the Owner citing reasons therefor.

5. If the Surety does not proceed as provided in Paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond fifteen days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Subparagraph 4.4, and the Owner refuses the payment tendered or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

6. After the Owner has terminated the Contractor's right to complete the Construction Contract, and if the Surety elects to act under Subparagraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. To the limit of the amount of this Bond, but subject to commitment by the Owner of the Balance of the Contract Price to mitigation of costs and damages on the Construction Contract, the Surety is obligated without duplication for:

6.1 The responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

6.2 Additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 4; and

6.3 Liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

7. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, or successors.

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

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page.

11. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted here from and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12 DEFINITIONS

12.1 Balance of the Contract Price: The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other

claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

12.2 Construction Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

12.3 Contractor Default: Failure of the Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Construction Contract.

12.4 Owner Default: Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction Contract or to perform and complete or comply with the other terms thereof.

MODIFICATIONS TO THIS BOND ARE AS FOLLOWS:

SAMPLE

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL
Company: (Corporate Seal)

SURETY
Company: (Corporate Seal)

Signature: _____
Name and Title:
Address:

Signature: _____
Name and Title:
Address:

THE AMERICAN INSTITUTE OF ARCHITECTS



Bond No. _____

AIA Document A312

Payment Bond

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONTRACTOR (Name and Address): _____

SURETY (Name and Principal Place of Business): _____

OWNER (Name and Address): _____

CONSTRUCTION CONTRACT
Date: _____
Amount: \$ _____
Description (Name and Location): _____

BOND

Date (Not earlier than Construction Contract Date): _____

Amount: \$ _____

Modifications to this Bond: _____

None

See Page 6

CONTRACTOR AS PRINCIPAL
COMPANY: _____
(Corporate Seal)

SURETY COMPANY: _____
(Corporate Seal)

Signature: _____
Name and Title:

Signature: _____
Name and Title:

Attorney-in-Fact

(Any additional signatures appear on page 6)

FOR INFORMATION ONLY-Name, Address and Telephone
AGENT OR BROKER: _____

OWNER'S REPRESENTATIVE (Architect,
Engineer or other party): _____

1. The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference.
2. With respect to the Owner, this obligation shall be null and void if the Contractor:
 - 2.1 Promptly makes payment, directly, or indirectly, for all sums due Claimants, and
 - 2.2 Defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity whose claim, demand, lien or suit is for the payment for labor, materials, or equipment furnished for use in the performance of the Construction Contract, provided the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety, and provided there is no Owner Default.
3. With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.
4. The Surety shall have no obligation to Claimants under this Bond until:
 - 4.1 Claimants who are employed by or have a direct contract with the Contractor have given notice to the Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.
 - 4.2 Claimants who do not have a direct contract with the Contractor:
 1. Have furnished written notice to the Contractor and sent a copy, or notice thereof, to the Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and
 2. Have either received a rejection in whole or in part from the Contractor, or not received within 30 days of furnishing the above notice any communication from the Contractor by which the Contractor has indicated the claim will be paid directly or indirectly; and
 3. Not having been paid within the above 30 days, have sent a written notice to the Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the Contractor.
5. If a notice required by Paragraph 4 is given by the Owner to the Contractor or to the Surety, that is sufficient compliance.
6. When the Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:
 - 6.1 Send an answer to the Claimant, with a copy to the Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
 - 6.2 Pay or arrange for payment of any undisputed amounts.
7. The Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.
8. Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any Construction Performance Bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.
9. The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.
10. The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.
11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the work or part of the work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Subparagraph 4.1 or Clause 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
12. Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page. Actual receipt of notice by Surety, the Owner or the Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.
13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
14. Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor

shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. DEFINITIONS

15.1 Claimant: An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's

subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

15.2 Construction Contract: The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3 Owner Default: Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction Contract or to perform and complete or comply with the other terms thereof.

MODIFICATIONS TO THIS BOND ARE AS FOLLOWS:

SAMPLE

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL
Company: (Corporate Seal)

SURETY
Company: (Corporate Seal)

Signature: _____
Name and Title:
Address:

Signature: _____
Name and Title:
Address:

GENERAL CONDITIONS OF CONTRACT

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1. CONSTRUCTION DOCUMENTS

- A. Construction Documents, listed in Table of Contents of this Specification volume shall form part of this Contract and provisions of Construction Documents shall be as binding upon parties as if they were fully set forth in Contract itself.
- B. These shall also be considered as part of Construction Documents: Addenda, including additions and modifications incorporated in such addenda before execution of Contract; requests for information; construction bulletins; change orders; and written interpretations by Architect / Engineer or Public Works Project Engineer that are made after execution of Contract.
- C. Construction Documents are complementary, and what is required by one shall be as binding as if required by all. Intent of Construction Documents is to include all labor, materials and equipment necessary for proper execution of the Work.

2. DEFINITIONS

- A. These terms as used in this Contract are respectively defined as follows:
 - 1. All uses of term “County” in Construction Documents shall mean Dane County.
 - 2. All uses of term “Department” in Construction Documents shall mean Department of Public Works, Highway & Transportation, which is a unit of Dane County government. Department is County agency overseeing Contract with Contractor.
 - 3. Public Works Project Engineer is appointed by and responsible to Department. Public Works Project Engineer has authority to act on behalf of Department and will sign change orders, payment requests and other administrative matters related to projects.
 - 4. Public Works Project Engineer is responsible for supervision, administration and management of field operations involved in construction phase of this Work.
 - 5. Term “Work” includes all labor, equipment and materials necessary to produce project required by Construction Documents.
 - 6. Term “Substantial Completion” is date when project or specified area of project is certified by Architect / Engineer that construction is sufficiently completed, in accordance with Construction Documents, and as modified by any subsequent changes agreed to by parties, so that County may occupy project or specified area of project for use for which it was intended subject to permit approval for occupancy.
 - 7. Contractor is person, firm, or corporation with whom County makes Contract. Though multiple contracts may be involved, Construction Documents treat them throughout as if each were of singular number.

3. ADDITIONAL INSTRUCTIONS AND DRAWINGS

- A. Contractor may be furnished additional instructions and detail drawings as necessary to carry out the Work included in Contract. Additional drawings and instructions thus supplied to Contractor will coordinate with Construction Documents and will be so prepared that they can be reasonably interpreted as part thereof. Contractor shall carry out the Work in accordance with additional detail drawings and instructions.

4. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

- A. Unless otherwise specified, Contractor shall submit three (3) copies of all Shop Drawings for each submission, until receiving final approval. After final approval, provide five (5) additional copies for distribution and such other copies as may be required.
- B. Contractor shall submit, on an on-going basis and as directed, Product Data such as brochures that shall contain catalog cuts and specifications of all furnished mechanical and electrical equipment. After Architect / Engineer's approval, one (1) copy shall remain in Architect / Engineer's file, one (1) kept at Department's office and one (1) kept at job site by Contractor for reference purposes.
- C. Samples shall consist of physical examples furnished by Contractor in sufficient size and quantity to illustrate materials, equipment or workmanship, and to establish standards to compare the Work.
 - 1. Submit Samples in sufficient quantity (minimum of two (2)) to permit Architect / Engineer to make all necessary tests and of adequate size showing quality, type, color range, finish, and texture. Label each Sample stating material, type, color, thickness, size, project name, and Contractor's name.
 - 2. Submit transmittal letter requesting approval, and prepay transportation charges to Architect / Engineer's office on samples forwarded.
 - 3. Materials installed shall match approved Samples.
- D. Contractor shall review Shop Drawings and place their dated stamp thereon to evidence their review and approval and shall submit with reasonable promptness and in orderly sequence to cause no delay in the Work or in work of any other contractor. At time of submission, Contractor shall inform Architect / Engineer in writing of any deviation in Shop Drawings or Samples from requirements of Construction Documents. Architect / Engineer will not consider partial lists.
- E. Architect / Engineer will review and approve or reject Shop Drawings with reasonable promptness to cause no delay. Architect / Engineer's approval shall not relieve Contractor from responsibility for errors or omission in Shop Drawings.
- F. Contractor shall not commence any work requiring Shop Drawing, Product Data or Sample submission until Architect / Engineer has approved submission. All such work shall be in accordance with approved Shop Drawings, Product Data and Samples.
- G. Contractor shall keep on site of the Work, approved or conformed copy of Shop Drawings and shall at all times give Department access thereto.
- H. By stamping and submitting Shop Drawings, Product Data and Samples, Contractor thereby represents that he or she has or will determine and verify all field measurements, field construction criteria, materials, catalog numbers, and similar data and that he or she has checked and coordinated each Shop Drawing, Product Data and Sample with requirements of the Work and of Construction Documents. Architect / Engineer shall return without examination, Shop Drawings, Product Data and Samples not so noted.
- I. All Shop Drawings from any one Contractor should be numbered consecutively and on cover sheet shall bear name and location of project, name of Contractor, date of submittal and date of each correction or revision and associated Specification section and page number.

5. CUTTING AND PATCHING

- A. Contractor shall be responsible for all cutting, fitting or patching required to complete the Work or to make its parts fit together properly.
- B. Contractor shall not damage or endanger portion of the Work or fully or partially completed construction of County or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. Contractor shall not cut or otherwise alter such construction by County or separate contractor except with written consent of County and of such separate contractor; such consent shall not be unreasonably withheld. Contractor shall not withhold unreasonably from County or separate contractor, Contractor's consent to cutting or otherwise altering the Work.

6. CLEANING UP

- A. Contractor shall keep premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under Contract. Contractor shall remove from and about the Work waste materials, rubbish, Contractor's tools, construction equipment, machinery, and surplus materials at completion of the Work. Contractor shall maintain streets and sidewalks around the Work site in clean condition. Contractor shall remove all spillage and prevent tracking of spillage arising from performance of the Work, into, out of, and within the Work site. Contractor shall establish regular maintenance program of sweeping, vacuuming and / or hosing to minimize accumulation of dirt and dust upon such areas.
- B. If Contractor fails to clean up as directed in Construction Documents, County may do so and shall charge Contractor cost thereof.
- C. Contractor shall be responsible for broken windows and glass, and at completion of the Work shall replace such damaged or broken windows and glass. After replacing damaged or broken windows and glass, Contractor shall remove all labels, wash and polish both sides of all windows and glass.
- D. In addition to general cleaning (sweeping, vacuuming and / or hosing, as is appropriate to work surface), Contractor shall perform following final cleaning for all trades at completion of the Work:
 - 1. Remove temporary protections;
 - 2. Remove marks, stains, fingerprints and other soil or dirt from painted, decorated and finished woodwork and wall surfaces;
 - 3. Remove spots, plaster, soil and paint from ceramic tile, marble and other finished materials, and wash or wipe clean;
 - 4. Clean fixtures, cabinet work and equipment, removing stains, paint, dirt and dust, and leave same in undamaged, new condition;
 - 5. Clean aluminum in accordance with recommendations of manufacturer; and
 - 6. Clean resilient floors thoroughly with well-rinsed mop containing only enough moisture to clean off any surface dirt or dust and buff dry by machine to bring surfaces to sheen.

7. USE OF SITE

- A. Contractor shall provide County and Architect / Engineer access to the Work under all circumstances.
- B. Contractor shall confine operations at site to areas permitted by County, law, ordinance, permits and Construction Documents and shall not unreasonably encumber site with materials

or equipment. Contractor shall assure free, convenient, unencumbered, direct and safe access to all properties adjacent to the Work for County, its employees, invitees and guests.

8. MATERIALS AND WORKMANSHIP

- A. Contractor shall perform all work and furnish all supplies and materials, machinery, equipment, facilities and means, necessary to complete the Work required by this Contract, within time specified, in accordance with provisions of Construction Documents.
- B. All equipment and materials incorporated in the Work covered by this Contract are to be new; use recycled and / or recovered materials to extent that such use is technically and economically feasible. Recovered materials are products recovered from solid waste in form identical to original form for use that is same as, or similar to original use. Recycled materials are products manufactured from solid waste.
- C. If requested, Contractor shall furnish satisfactory evidence as to kind and quality of construction materials proposed or used. Contractor shall furnish to Architect / Engineer, for approval, manufacturer name and model, performance capacities and other pertinent information of machinery, mechanical, electrical or other types of equipment, which Contractor plans to install.
- D. If not otherwise provided, materials and labor called for in this Contract shall be provided and performed in accordance with established practice and standards recognized by Architects, Engineers, Department, and construction industry.
- E. Reference to "Standard" specifications of any association or manufacturer, or codes of County authorities, intends most recent printed edition or catalog in effect on date that corresponds with date of Construction Documents.
- F. Whenever reference is made in Specifications that work shall be "performed", "applied", in accordance with "manufacturer's directions or instructions", Contractor to whom those instructions are directed shall furnish three (3) printed copies of such instructions to Architect / Engineer before execution of the Work.

9. CONTRACTOR'S TITLE TO MATERIALS

- A. Contractor or any subcontractor shall not purchase materials or supplies for the Work subject to any chattel mortgage or under conditional sale contract or other agreement by which seller retains interest. Contractor warrants that all materials and supplies used in the Work are free from all liens, claims or encumbrances and Contractor has good title to them.

10. "OR EQUAL" CLAUSE

- A. Whenever equipment or materials are identified on Drawings or in Specifications by reference to manufacturer's or vendor's name, trade name, catalog number, and other identifying information, it is intended to establish standards; and any equipment or material of other manufacturers and vendors which will perform adequately duties imposed by general design will be considered equally accepted provided equipment or material so proposed is, in opinion of Architect / Engineer, of equal substance and function. Architect / Engineer and Department shall provide written approval before Contractor may purchase or install it.

- B. Equipment or materials of manufacturers, other than those named, may be used only upon following conditions:
1. That, in opinion of Architect / Engineer and Department, proposed material or equipment item is fully equal or superior (in design, materials, construction, workmanship, performance, finish, etc.) to named item. No compromise in quality level, however small, is acceptable.
 2. That, in substituting materials or equipment, Contractor assumes responsibility for any changes in system or for modifications required in adjacent or related work to accommodate such substitution despite Architect / Engineer's and Department's approval, and all costs growing out of approval of "or equal" items shall be responsibility of Contractor. No extra costs resulting from such approval shall become responsibility of Department, Architect / Engineer or any other separate Contractor.
 3. It shall be understood that use of materials or equipment other than those specified, or approved equal by Architect / Engineer and Department, shall constitute violation of Contract, and that Architect / Engineer and Department shall have right to require removal of such materials or equipment and their replacement with specified materials or equipment at Contractor's expense.
 4. Product and manufacturer named first in Specifications or on information shown on Drawings is basis of selection of manufactured items and equipment, particularly mechanical equipment. In using other than first named products or manufacturers, including those specified as additionally approved or acceptable, Contractor assumes responsibility for any changes in system and for modifications in any work required to accommodate them. Architect / Engineer's approval of such additionally acceptable products or manufacturers, either in Specifications or in Addendum, does not relieve Contractor from obligation to coordinate such optional products with other Contractors, whose work may be affected by them, and to pay all additional costs resulting from their inclusion into the Work. Contractor's liability shall include payment of Architect / Engineer's fees for any additional services made necessary by or directly connected to such product changes. No extra costs resulting from such changes shall become responsibility of Department, Architect / Engineer or any other separate Contractor.
- C. No request for approval of "or equal" materials will be entertained except from Contractor. Identify any request for substitution as substitution on Contractor's letter of transmittal and give reasons for substitution. Department may in its sole discretion allow substitutions of materials.

11. PATENTS AND ROYALTIES

- A. If Contractor uses any design, device or material covered by letters, patent or copyright, it is mutually agreed and understood, that, without exception, contract prices shall include all royalties or costs arising from use of such design, device or materials, in any way involved in the Work.
- B. Contractor shall indemnify and save harmless County from any and all claims for infringement by reason of use of such patent or copyright in connection with the Work agreed to be performed under this Contract, and shall indemnify County for any cost, expense or damage which it may be obliged to pay by reason of such infringement at any time during prosecution of the Work or after completion of the Work.

12. SURVEYS, PERMITS, REGULATIONS AND TAXES

- A. Department will furnish to Contractor all site, topography and property surveys necessary for execution of the Work.

- B. Contractor shall procure all permits, licenses and approvals necessary for execution of this Contract.
- C. Contractor shall give all notices and comply with all State of Wisconsin, Federal and local laws, codes, rules and regulations relating to performance of the Work, protection of adjacent property, and maintenance of passageways, guard fences or other protective facilities.
- D. Contractor shall pay all Sales, Consumer, Use and other similar taxes required by law.
- E. Contractor shall promptly notify Architect / Engineer of any variances of Drawings or Specifications with that of any State of Wisconsin, federal or local law, code, rule or regulation. Upon such notification, Architect / Engineer will require correction of variance to comply with applicable law, code, rule or regulation at no additional cost to Contractor.
- F. Work under this Contract shall comply with all applicable State of Wisconsin, Federal and local laws, codes and regulations.
- G. Contractor shall pay charges for water, sewer and other utility connections made by municipalities where required by Specifications.

13. CONTRACTOR'S OBLIGATIONS AND SUPERINTENDENCE

- A. Contractor shall provide and pay for all materials, labor, tools, equipment, transportation and superintendence necessary to execute, complete and deliver the Work within specified time. Contractor agrees to secure at their own expense all personnel necessary to carry out the Work. Such personnel shall not be deemed County employees nor shall they have or be deemed to have any direct contractual relationship with County.
- B. Performance of any work necessary after regular working hours, on Sundays or Legal Holidays shall be without additional expense to County. Performance of any work at site at other than normal working hours must be coordinated with Public Works Project Engineer.
- C. Contractor shall furnish, erect, maintain and remove such temporary works as may be required.
- D. Contractor shall observe, comply with, and be subject to all terms, conditions, requirements and limitations of Construction Documents.
- E. At the Work site, Contractor shall give personal superintendence to the Work or shall employ construction superintendent or foreman, experienced in character of work covered by Contract, who shall have full authority to act for Contractor. Understand that such superintendent or foreman shall be acceptable to Architect / Engineer and Department.
- F. Remove from project or take other corrective action upon notice from Architect / Engineer or Department for Contractor's employees whose work is considered by Architect / Engineer or Department to be unsatisfactory, careless, incompetent, unskilled or otherwise objectionable.
- G. Contractor and subcontractors shall be required to conform to Labor Laws of State of Wisconsin and various acts amendatory and supplementary thereto and to other laws, ordinances and legal requirements applicable to the Work.

- H. Presence and observation of the Work by Architect / Engineer or Public Works Project Engineer shall not relieve Contractor of any obligations.

14. WEATHER CONDITIONS

- A. In event of temporary suspension of work, or during inclement weather, or whenever Architect / Engineer shall direct, Contractor shall, and shall cause subcontractors to protect carefully all work and materials against damage or injury from weather. If, in opinion of Architect / Engineer or Department, any work or materials that have been damaged or injured due to failure on part of Contractor or any subcontractors so to protect the Work, such materials shall be removed and replaced at expense of Contractor.

15. PROTECTION OF WORK AND PROPERTY

- A. Contractor shall at all times safely guard County's property from injury or loss in connection with this Contract. Contractor shall at all times safely guard and protect the Work, and adjacent property, from damage. Contractor shall replace or make good any such damage, loss or injury unless such be caused directly by errors contained in Contract, or by County, or County's duly authorized representative.
- B. Contractor may act diligently, without previous instructions from Architect / Engineer and / or Department, in emergency that threatens loss or injury of property, or safety of life. Contractor shall notify Architect / Engineer and / or Department immediately thereafter. Promptly submit any claim for compensation by Contractor due to such extra work to Architect / Engineer and / or Department for approval as provided for in Article 18 herein.

16. INSPECTION AND TESTING OF MATERIALS

- A. Authorized representatives and agents of County government shall have access at all times to the Work wherever it is in preparation or progress and Contractor shall provide facilities for such access and for inspection.
- B. Should it be considered necessary or advisable at any time before final acceptance of the Work to make examination of work already completed, by removing or tearing out same, Contractor shall upon request, promptly furnish all necessary facilities, labor and materials. If such work is found to be defective in any aspect, due to fault of Contractor or subcontractors thereof, Contractor shall assume all expenses of such examination and of satisfactory reconstruction. Contractor will be reimbursed for such examination and replacement in accordance with Article 18 - A.3., of these General Conditions of Contract if such work is found to meet requirements of Contract.
- C. If Specifications, Architect / Engineer's, or Public Works Project Engineer's instructions require any work to be specially tested or approved, Contractor shall give Architect / Engineer and Public Works Project Engineer timely notice of its readiness for testing or inspection. Test all materials and equipment requiring testing in accordance with accepted or specified standards, as applicable. Architect / Engineer shall recommend laboratory or inspection agency and Department will select and pay for all initial laboratory inspection services. Should retesting be required, due to failure of initial testing, cost of such retesting shall be borne by Contractor.
- D. Cost of any testing performed by manufacturers or Contractor for substantiating acceptability of proposed substitution of materials and equipment, or necessary conformance testing in

conjunction with manufacturing processes or factory assemblage, shall be borne by Contractor or manufacturer responsible.

17. REPORTS, RECORDS AND DATA

- A. Contractor shall submit to Architect / Engineer and Public Works Project Engineer such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, invoices, records and other data as either may request concerning work performed or to be performed under this Contract.

18. CHANGES IN THE WORK

- A. Make no changes, except in cases of emergency, in the Work covered by approved Construction Documents without having prior written approval of Department. Charges or credits for the Work covered by approved change shall be determined by one of these methods:
1. Unit bid prices previously approved.
 2. Agreed lump sum based on actual cost of:
 - a) Labor, including foremen, and all fringe benefits that are associated with their wages.
 - b) Materials entering permanently into the Work.
 - c) Ownership or rental cost of construction tools and equipment during time of use on extra work.
 - d) Power and consumable supplies for operation of power equipment.
 - e) Workmen's Compensation Insurance, Contractor's Public Liability and Property Damage Insurance, and Comprehensive Automobile Liability Insurance.
 - f) Social Security and old age and unemployment contributions.
 - g) Add to cost under (2), fixed fee to be agreed upon, but not to exceed fifteen percent (15%) of actual cost of work performed with their own labor force. Fee shall be compensation to cover cost of supervision, overhead, bond, profit and any other general expense.
 - h) On that portion of the Work under (2) done under subcontract, Contractor may include not over seven and one-half percent (7½%) for supervision, overhead, bond, profit and any other general expense.
 - i) Department may require correct amount of costs with supporting vouchers; Contractor shall keep and present in such form as directed.
 3. Cost-plus work, with not-to-exceed dollar limit, based on actual cost of:
 - a) Labor, including foremen, and all fringe benefits that are associated with their wages.
 - b) Materials entering permanently into the Work.
 - c) Ownership or rental cost of construction tools and equipment during time of use on extra work. Rental cost cannot exceed fifty percent (50%) replacement value of rented equipment.
 - d) Power and consumable supplies for operation of power equipment.
 - e) Workmen's Compensation Insurance, Contractor's Public Liability and Property Damage Insurance, and Comprehensive Automobile Liability Insurance.
 - f) Social Security and old age and unemployment contributions.
 - g) To cost under (3), there shall be added fixed fee to be agreed upon but not to exceed fifteen percent (15%) of actual cost of work performed with their own labor force. Fee shall be compensation to cover cost of supervision, overhead, bond, profit, and any other general expense.
 - h) On that portion of the Work under (3) done under subcontract, Contractor may include not over seven and one-half percent (7½%) for supervision, overhead, bond, profit, and any other general expense.

- i) Contractor shall keep and present, in such form as directed, correct amount of cost together with such supporting vouchers as may be required by Department.
- B. If Contractor claims that by any instructions given by Architect / Engineer, Department, by drawings or otherwise, regarding performance of the Work or furnishing of material under Contract, involves extra cost, Contractor shall give Department written notice of cost thereof within two (2) weeks after receipt of such instructions and in any event before proceeding to execute work, unless delay in executing work would endanger life or property.
- C. No claim for extra work or cost shall be allowed unless it was done in pursuance of written Change Order from Architect / Engineer and approved by Department, as previously mentioned, and claim presented with payment request submitted after changed or extra work is completed.
- D. Negotiation of cost for change in the Work shall not be cause for Contractor to delay prosecution of the Work if Contractor has been authorized in writing by Public Works Project Engineer to proceed.

19. EXTRAS

- A. Without invalidating Contract, Department may order extra work or make changes by altering, adding to or deducting from the Work, contract sum being adjusted in accordance with Article 18 herein.

20. TIME FOR COMPLETION

- A. Contractor agrees that the Work shall be prosecuted regularly and diligently and complete the Work within the time stated in Bid.

21. CORRECTION OF WORK

- A. All work, all materials whether incorporated in the Work or not, and all processes of manufacture shall at all times and places be subject to inspection of Architect / Engineer and Public Works Project Engineer who shall be judge of quality and suitability of the Work, materials, and processes of manufacture for purposes for which they are used. Should they fail to meet Architect / Engineer's and Public Works Project Engineer's approval they shall be reconstructed, made good, replaced or corrected, by Contractor at Contractor's expense. Immediately remove all rejected material from site.
- B. If Contractor defaults or neglects to carry out the Work in accordance with Construction Documents or fails to perform any provision of Contract, Department may, after ten (10) days' written notice to Contractor and without prejudice to any other remedy County may have, make good such deficiencies. In such case, appropriate Change Order shall be issued deducting from Contractor's payments then or thereafter, cost of correcting such deficiencies, including cost of Architect / Engineer's additional services made necessary by such default, neglect or failure.

22. SUBSURFACE CONDITIONS FOUND DIFFERENT

- A. If Contractor encounters subsurface or latent conditions at site materially differing from those shown on Drawings or indicated in Specifications, Contractor shall immediately give notice to Architect / Engineer and Public Works Project Engineer of such conditions before they are

disturbed. Architect / Engineer will thereupon promptly investigate conditions, and if Architect / Engineer finds that they materially differ from those shown on Drawings or indicated in Specifications, Architect / Engineer will at once make such changes as necessary, any increase or decrease of cost resulting from such changes to be adjusted in manner provided in above Article 18 entitled "Changes in the Work".

23. RIGHT OF DEPARTMENT TO TERMINATE CONTRACT

- A. In event that any provisions of this Contract are violated by Contractor or by any subcontractors, County may serve written notice upon Contractor and Surety of its intention to terminate Contract, such notice to contain reasons for such intention to terminate Contract, and unless within ten (10) days after serving of such notice upon Contractor, such violation or delay shall cease and satisfactory arrangement or correction be made, Contract shall, upon expiration of said ten (10) days, cease and terminate.
- B. In event of any such termination, County shall immediately serve notice thereof upon Surety and Contractor, and Surety shall have right to take over and perform Contract subject to County's approval; provided, however, that if Surety does not commence performance thereof within ten (10) days from date of mailing to such Surety of notice of termination, County may take over the Work and prosecute same to completion by contract, or by force account, at expense of Contractor; Contractor and Surety shall be liable to County for any excess cost occasioned County thereby, and in such event County may take possession of and utilize in completing the Work, such materials and equipment as may be on the Work site and therefore necessary.

24. CONSTRUCTION SCHEDULE AND PERIODIC ESTIMATES

- A. Contractor shall be responsible for Construction Schedule and coordination. Immediately after execution and delivery of Contract and before making first payment, Contractor shall notify all subcontractors to furnish all required information to develop Construction Schedule. Contractor and all subcontractors associated with the Work shall furnish following information from each Division of Specifications:
 - 1. List of construction activities;
 - 2. Start, finish and time required for completion of each activity;
 - 3. Sequential relationships between activities;
 - 4. Identify all long lead-time items, key events, meetings or activities such as required submittals, fabrication and delivery, procurement of materials, installation and testing;
 - 5. Weekly definition of extent of work and areas of activity for each trade or Subcontract; and
 - 6. Other information as determined by Public Works Project Engineer.
- B. In addition to above requested items, Contractor shall request delivery dates for all County-furnished equipment, materials or labor. This shall include any work handled by Department under separate contracts such as asbestos abatement, air and water balancing, etc. Indicate on Construction Schedule these associated delivery and installation dates.
- C. Progress Reporting:
 - 1. Contractor shall update and publish Construction Schedule on monthly basis. Revisions to Schedule shall be by Contractor and made in same detail as original Schedule and accompanied by explanation of reasons for revision; and shall be subject to approval by Department.

2. Failure of Contractor to keep Schedule in updated format shall result in County hiring firm specializing in construction schedule development and deducting those costs associated with updating process from payments due Contractor.
 3. Contractor shall submit show actual percentage of each activity completed, estimated future progress, and anticipated completion time.
- D. Responsibility for timely completion requires:
1. Contractor and subcontractors understand that performance of each is interdependent upon performance of others.
 2. Whenever it becomes apparent from current schedule, that phasing or progress completion dates will not be met, Contractor must take some or all following actions at no additional cost to County:
 - a) Increase construction manpower in such quantities and crafts as will eliminate backlog of work.
 - b) Increase number of working hours per shift, shifts per working day, working days per week, amount of construction equipment, or any combination of foregoing to eliminate backlog of work.
 - c) Reschedule work (yet remain in conformance with Drawings and Specifications).
 3. Prior to proceeding with any of above actions, Contractor shall notify Public Works Project Engineer.
- E. Maintain current Construction Schedule at all times. Revise Construction Schedule in same detail as original and accompany with explanation of reasons for revision. Schedule shall be subject to approval by Architect / Engineer and Public Works Project Engineer.

25. PAYMENTS TO CONTRACTOR

- A. Contractor shall provide:
1. Detailed estimate giving complete breakdown of contract price by Specification Division; and
 2. Periodic itemized estimates of work done for purpose of making partial payments thereon.
- Submit these estimates for approval first to Architect / Engineer, then to Public Works Project Engineer. Costs employed in making up any of these schedules are for determining basis of partial payments and not considered as fixing basis for additions to or deductions from Contract price.
- B. County will make partial payments to Contractor for value, proportionate to amount of Contract, of all labor and material incorporated in the Work during preceding calendar month upon receipt of Application and Certificate for Payment form from Architect / Engineer and approval of Department.
- C. Contractor shall submit for approval first to Architect / Engineer, and then to Public Works Project Engineer all Application and Certificate for Payment forms. If requested, Application and Certificate for Payment shall be supported by such additional evidence as may be required, showing Contractor's right to payment claimed.
- D. Application and Certificate for Payment for preparatory work and materials delivered and suitably stored at site to be incorporated into the Work at some future period, will be given due consideration. Requesting payment for materials stored off site, may be rejected, however, if deemed essential for reasons of job progress, protection, or other sufficient cause, requests will be considered, conditional upon submission by Contractor of bills of sale, photographs and such other procedures as will adequately protect County's interest such as

storage in bonded warehouse with adequate coverage. If there is any error in payment, Contractor is obligated to notify Department immediately, but no longer than ten (10) days from receipt of payment.

- E. Payments by County will be due within forty-five (45) days after receipt by Department of Application and Certificate for Payment.
- F. County will retain five percent (5%) of each Application and Certificate for Payment until final completion and acceptance of all the Work covered by Contract. However, anytime after fifty percent (50%) of the Work has been furnished and installed at site, County will make remaining payments in full if Architect / Engineer and Public Works Project Engineer find that progress of the Work corresponds with Construction Schedule. If Architect / Engineer and Public Works Project Engineer find that progress of the Work does not correspond with Construction Schedule, County may retain up to ten percent (10%) of each Application and Certificate for Payment for the Work completed.
- G. All material and work covered by partial payments made shall become sole property of County, but this provision shall not be construed as relieving Contractor from sole responsibility for care and protection of materials and work upon which payments have been made, or restoration of any damaged work, or as waiver of right of County to require fulfillment of all of terms of Contract.
- H. County will make final payment within sixty (60) days after final completion of the Work, and will constitute acceptance thereof. Submit Equal Benefits Compliance Payment Certification with final pay request. Payment may be denied if Certification is not included.
- I. County may make payment in full, including retained percentages and less authorized deductions, upon completion and acceptance of each Division where price is stated separately in Contract.
- J. Every contractor engaged in performance of any contract for Department of Public Works, Highway & Transportation shall submit to this Department, as requested and with final application for payment for work under said contract, affidavit(s) as required to prove that all debts and claims against this Work are paid in full or otherwise satisfied, and give final evidence of release of all liens against the Work and County. If Wisconsin Prevailing Wage Rate Determination is required for this Work, use "Prime Contractor Affidavit of Compliance With Prevailing Wage Rate Determination" and "Agent or Subcontractor Affidavit of Compliance With Prevailing Wage Rate Determination" (if applicable). If Wisconsin Prevailing Wage Rate Determination is not required for this Work, use "Dane County, Wisconsin Contractor Wage Affidavit". Forms of such affidavits are included in Supplementary Conditions.

26. WITHHOLDING OF PAYMENTS

- A. County, after having served written notice on said Contractor, may either pay directly any unpaid bills of which Department has written notice, or withhold from Contractor's unpaid compensation sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged; whereupon, payment to Contractor shall be resumed in accordance with terms of this Contract, but in no event shall these provisions be construed to impose any obligations upon County to either Contractor or Contractor's Surety.

- B. In paying any unpaid bills of Contractor, County shall be deemed agent of Contractor, and any payment so made by County, shall be considered as payment made under Contract by County to Contractor and County shall not be liable to Contractor for any such payment made in good faith.
- C. Contractor shall indemnify, hold harmless and defend Dane County, its boards, commissions, agencies, officers, employees and representatives from all claims growing out of lawful demands of subcontractors, laborers, workmen, mechanics, material men, and furnishers of machinery and parts thereof, equipment, power tools, and all supplies, including commissary, incurred in performance of this Contract.
- D. At Department's request, Contractor shall furnish satisfactory evidence that all obligations of nature designated above have been paid, discharged or waived.

27. ACCEPTANCE OF FINAL PAYMENT AS RELEASE

- A. Making of final payment shall constitute waiver of all claims by County except those arising from:
 - 1. Unsettled lien;
 - 2. Faulty or defective work appearing after substantial completion;
 - 3. Failure of the Work to comply with requirements of Construction Documents; or
 - 4. Terms of any special guarantees required by Construction Documents.
- B. Acceptance of final payment shall constitute waiver of all claims by Contractor.

28. PAYMENTS BY CONTRACTOR

- A. Contractor shall pay following not later than fifth (5th) day following each payment received from County:
 - 1. All transportation and utility services rendered;
 - 2. All materials, tools, and other expendable equipment that have been delivered at site of the Work to extent of ninety percent (90%) of cost thereof, and balance of cost thereof when said balance is paid to Contractor; and
 - 3. Each subcontractor, respective amount allowed Contractor because of work performed by subcontractor to extent of subcontractor's interest therein.

29. CONTRACT SECURITY

- A. Contractor shall furnish Performance and Payment Bonds in amount at least equal to one hundred percent (100%) of Contract price as security for faithful performance of this Contract and payment of all persons performing labor on project under this Contract and furnishing materials in connection with this Contract.
- B. Sample Performance and Payment Bonds that Contractor will be required to execute is bound into these Construction Documents. Before construction Contract is consummated, completed Performance and Payment Bonds must be approved by Department.

30. ASSIGNMENTS

- A. Contractor shall not assign whole or any part of this Contract or any moneys due or to become due hereunder without written consent of Department. In case Contractor assigns all or any part of any moneys due or to become due under this Contract, instrument of

assignment shall contain clause substantially to effect that it is agreed that right of assignee in and to any moneys due or to become due to Contractor shall be subject to prior claims of all persons, firms and corporations for services rendered or materials supplied for performance of the Work called for in this Contract.

31. MUTUAL RESPONSIBILITY OF CONTRACTORS

- A. If, through acts of neglect on part of Contractor or any subcontractor shall suffer loss or damage on the Work, Contractor agrees to settle with such subcontractor by agreement or arbitration if such other subcontractor will so settle. If such subcontractor shall assert any claim against County on account of any damage alleged to have been sustained, Department shall notify Contractor, who shall indemnify, hold harmless and defend Dane County, its boards, commissions, agencies, officers, employees and representatives against any such claim.

32. SEPARATE CONTRACTS

- A. Department may award other contracts for the Work and all Contractors shall fully cooperate with each other and carefully adjust their work to that provided under other contracts as may be directed by Department. No Contractor shall commit or permit any act that will interfere with performance of the Work by any other Contractor.
- B. Contractor shall coordinate the Work with those of other Contractors. Cooperation will be required in arrangement for storage of materials and in detailed execution of the Work. Contractor, including subcontractors, shall keep informed of progress and detail work of others and shall notify Architect / Engineer or Department immediately of lack of progress or defective workmanship on part of others. Failure of Contractor to keep informed of the Work progressing on site and failure to give notice of lack of progress or defective workmanship by others shall be construed as acceptance by Contractor of status of the Work as being satisfactory for proper coordination with Contractor's own work.

33. SUBCONTRACTS

- A. Contractor may use services of specialty subcontractors on those parts of the Work that, under normal contracting practices, are performed by specialty subcontractors.
- B. Contractor shall not award any work to any subcontractor without prior approval of Department. Qualifications of subcontractors shall be same as qualifications of Contractor. Request for subcontractor approval shall be submitted to Department fifteen (15) days before start of subcontractor's work. If subcontractors are changed or added, Contractor shall notify Department in writing.
- C. Contractor shall be as fully responsible to County for acts and omissions of subcontractors, and of persons either directly or indirectly employed by them, as Contractor is for acts and omissions of persons directly employed by Contractor.
- D. Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind subcontractors to Contractor by terms of General Conditions of Contract and other Construction Documents insofar as applicable to work of subcontractors and to give Contractor same power as regards terminating any subcontract that Department may exercise over Contractor under any provision of Construction Documents.

- E. Nothing contained in this Contract shall create any contractual relation between any subcontractor and County.
- F. Contractor shall insert in all subcontracts, Articles 26, 33, 43 and 45, respectively entitled: “Withholding of Payments”, “Subcontracts”, “Affirmative Action Provision and Minority / Women / Disadvantaged Business Enterprises”, and “Minimum Wages”, and shall further require all subcontractors to incorporate physically these same Articles in all subcontracts.

34. PUBLIC WORKS PROJECT ENGINEER’S AUTHORITY

- A. Public Works Project Engineer shall:
 - 1. Administer and ensure compliance with Construction Documents;
 - 2. Provide responsible on-site observations of construction and have authority to request work and to stop work whenever necessary to insure proper enforcement of Construction Documents;
 - 3. Convene and chair project meetings and foreman’s coordination meetings when necessary to coordinate resolution of conflicts between Contractors, Architects, Engineers, Consultants, and Department; and
 - 4. Check and inspect material, equipment and installation procedures of all trades for proper workmanship and for compliance with Drawings, Specifications and Shop Drawings, permit no material on project site that is not satisfactory and reject work not in compliance with Construction Documents.

35. ARCHITECT / ENGINEER’S AUTHORITY

- A. Architect / Engineer is retained by, and is responsible to Department acting for County.
- B. Architect / Engineer shall determine amount, quality, acceptability, and fitness of several kinds of work and materials that are provided under this Contract and shall decide all questions that may arise in relation to said work and construction thereof.
- C. Architect / Engineer shall decide meaning and intent of any portion of Specifications and of any Drawings where they may be found obscure or be in dispute.
- D. Architect / Engineer shall provide responsible observation of construction. Architect / Engineer has authority to stop the Work whenever such stoppage may be necessary to insure proper execution of Construction Documents.
- E. Architect / Engineer shall be interpreter of conditions of Construction Documents and judge of its performance.
- F. Within reasonable time, Architect / Engineer shall make decisions on all matters relating to progress of the Work or interpretation of Construction Documents.
- G. Architect / Engineer’s decisions are subject to review by Public Works Project Engineer.

36. STATED ALLOWANCES

- A. Stated allowances enumerated in Instructions to Bidders shall cover net cost of materials or equipment, and all applicable taxes. Contractor’s cost of delivery and unloading at site, handling costs on site, labor, installation costs, overhead, profit and any other incidental costs shall be included in Contractor’s bid, but not as part of cash allowance.

- B. Department will solicit at least two (2) bids on materials or equipment for which allowance is stated and select on basis of lowest qualified responsible bid. Contractor will then be instructed to purchase "Allowed Materials". If actual price for purchasing "Allowed Materials", including taxes, is more or less than "Cash Allowance", Contract price shall be adjusted accordingly. Adjustment in Contract price shall not contain any cost items excluded from cash allowance.

37. ESTIMATES OF QUANTITIES

- A. Whenever estimated quantities of work to be done and materials to be furnished under this Contract are shown in any of Construction Documents, they are given for use in comparing bids and right is especially reserved to increase or diminish them as they may be deemed reasonably necessary or desirable by Department to complete the Work included in this Contract, and cost for such increase or diminution shall be adjusted in manner provided for in General Conditions of Contract Article 18 entitled "Changes in the Work".

38. LANDS AND RIGHTS-OF-WAY

- A. Prior to start of construction, County shall furnish all land and rights-of-way necessary for carrying out and completion of the Work to be performed under this Contract.

39. GENERAL GUARANTEE

- A. Neither final certificate of payment nor any provision in Construction Documents nor partial or entire occupancy of premises by County shall constitute acceptance of work not done in accordance with Construction Documents or relieve Contractor of liability in respect to any expressed warranties or responsibility for faulty materials or workmanship.
 - 1. In no event shall making of any payment required by Contract constitute or be construed as waiver by County of any breach of covenants of Contract or waiver of any default of Contractor and making of any such payment by County while any such default or breach shall exist shall in no way impair or prejudice right of County with respect to recovery of damages or other remedy as result of such breach or default.
- B. Contractor shall remedy and make good all defective workmanship and materials and pay for any damage to other work resulting there from, which appear within period of one (1) year from date of substantial completion, providing such defects are not clearly due to abuse or misuse by County. Department will give notice of observed defects with reasonable promptness.
- C. Guarantee on work executed after certified date of substantial completion will begin on date when such work is inspected and approved by Architect / Engineer and Public Works Project Engineer.
- D. Where guarantees or warranties are required in sections of Specifications for periods in excess of one (1) year, such longer terms shall apply; however, Contractor's Performance and Payment Bonds shall not apply to any guarantee or warranty period in excess of one (1) year.

40. CONFLICTING CONDITIONS

- A. Any provision in any of Construction Documents which may be in conflict or inconsistent with any Articles in these General Conditions of Contract or Supplementary Conditions shall be void to extent of such conflict or inconsistency.
- B. In case of ambiguity or conflict between Drawings and Specifications, Specifications shall govern.
- C. Printed dimensions shall be followed in preference to measurements by scale. Large-scale drawings take precedence over small-scale drawings. Dimensions on Drawings and details are subject to field measurements of adjacent work.

41. NOTICE AND SERVICE THEREOF

- A. Any notice to Contractor from Department relative to any part of this Contract shall be in writing and considered delivered and service thereof completed, when said notice is posted, by certified or registered mail, to Contractor at Contractor's last given address, or delivered in person to said Contractor, or Contractor's authorized representative on the Work.

42. PROTECTION OF LIVES AND HEALTH

- A. In order to protect lives and health of Contractor's employees under Contract, Contractor shall comply with all pertinent provisions of Wisconsin Administrative Code, Rules of Department of Commerce, relating to Safety and Health.
- B. Contractor alone shall be responsible for safety, efficiency and adequacy of Contractor's tools, equipment and methods, and for any damage that may result from their failure or their improper construction, maintenance or operation.

43. AFFIRMATIVE ACTION PROVISION AND MINORITY / WOMEN / DISADVANTAGED BUSINESS ENTERPRISES

- A. Affirmative Action Provisions.
 - 1. During term of their Contract, Contractor agrees not to discriminate on basis of race, religion, color, sex, handicap, age, sexual preference, marital status, physical appearance, or national origin against any person, whether recipient of services (actual or potential), employee, or applicant for employment. Such equal opportunity shall include but not be limited to following: employment, upgrading, demotion, transfer, recruitment, advertising, layoff, termination, training, rates of pay, and any other form of compensation or level of service(s). Contractor agrees to post in conspicuous places, these affirmative action standards so as to be visible to all employees, service recipients and applicants for this paragraph. Listing of prohibited bases for discrimination shall not be construed to amend in any fashion state or federal law setting forth additional bases and exceptions shall be permitted only to extent allowable in state or federal law.
 - 2. Contractor is subject to this Article only if Contractor has ten (10) or more employees and receives \$10,000.00 or more in annual aggregate contracts with County. Contractor shall file and Affirmative Action Plan with Dane County Contract Compliance Officer in accord with Chapter 19 of Dane County Code of Ordinances. Such plan must be filed within fifteen (15) days of effective date of this Contract and failure to do so by said date shall constitute ground for immediate termination of Contract by County. Contractor shall also, during term of this Contract, provide copies of all announcements of employment opportunities to County's Contract Compliance Office, and shall report

- annually number of persons, by race, sex and handicap status, who apply for employment and, similarly classified, number hired and number rejected.
3. Contact Dane County Contract Compliance Officer at Dane County Contract Compliance Office, 210 Martin Luther King, Jr. Blvd., Room 421, Madison, WI 53703, 608/266-4114.
 4. In all solicitations for employment placed on Contractor's behalf during term of this Contract, Contractor shall include statement to effect Contractor is "Equal Opportunity Employer". Contractor agrees to furnish all information and reports required by County's Contract Compliance Officer as same relate to affirmative action and nondiscrimination, which may include any books, records, or accounts deemed appropriate to determine compliance with Chapter 19, Dane County Code of Ordinances, and provision of this Contract.

B. Minority / Women / Disadvantaged / Emerging Small Business Enterprises.

1. Chapter 19.508 of Dane County Code of Ordinances is official policy of Dane County regarding utilization of, to fullest extent of, Minority Business Enterprises (MBEs), Women Business Enterprises (WBEs) Disadvantage Business Enterprises (DBEs) and Emerging Small Business Enterprises (ESBEs).
2. Contractor may utilize MBEs / WBEs / DBEs / ESBEs as subcontractors or suppliers. List of subcontractors will be required of low bidder as stated in this Contract. List shall indicate which are MBEs / WBEs / DBEs / ESBEs and percentage of subcontract awarded, shown as percentage of total dollar amount of bid.

44. COMPLIANCE WITH FAIR LABOR STANDARDS

- A. During term of this Contract, Contractor shall report to County Contract Compliance Officer, within ten (10) days, any allegations to, or findings by National Labor Relations Board (NLRB) or Wisconsin Employment Relations Commission (WERC) that Contractor has violated statute or regulation regarding labor standards or relations. If investigation by Contract Compliance Officer results in final determination that matter adversely affects Contractor's responsibilities under this Contract, and which recommends termination, suspension or cancellation of this Contract, County may take such action.
- B. Contractor may appeal any adverse finding by Contract Compliance Officer as set forth in Dane County Ordinance 25.015(11)(c) through (e).
- C. Contractor shall post this statement in prominent place visible to employees: "As condition of receiving and maintaining contract with Dane County, this employer shall comply with federal, state and all other applicable laws prohibiting retaliation or union organizing."

45. DOMESTIC PARTNERSHIP BENEFITS

- A. Contractor agrees to provide same economic benefits to all of its employees with domestic partners as it does to employees with spouses, or cash equivalent if such benefit cannot reasonably be provided. Contractor agrees to make available for County inspection Contractor's payroll records relating to employees providing services on or under this Contract or subcontract. If any payroll records of Contractor contain any false, misleading or fraudulent information, or if Contractor fails to comply with provisions of Chapter 25.016, Dane County Ordinances, contract compliance officer may withhold payments on Contract; terminate, cancel or suspend Contract in whole or in part; or, after due process hearing, deny Contractor right to participate in bidding on future County contracts for period of one year after first violation is found and for period of three years after second or subsequent violation is found.

46. USE AND OCCUPANCY PRIOR TO ACCEPTANCE

- A. Contractor agrees to use and occupancy of portion or unit of the Work before formal acceptance by Department, provided Department:
 - 1. Secures written consent of Contractor; except when in opinion of Public Works Project Engineer, Contractor is chargeable with unwarranted delay in final cleanup of punch list items or other Contract requirements.
 - 2. Secures endorsement from insurance carrier and consent of Surety permitting occupancy of building or use of the Work during remaining period of construction, or, secures consent of Surety.
 - 3. Assumes all costs and maintenance of heat, electricity and water.
 - 4. Accepts all work completed within that portion or unit of the Work to be occupied, at time of occupancy.

47. MINIMUM WAGES

- A. Contractor shall post, at appropriate conspicuous point on site of project, schedule showing all determined minimum wage rates for various classes of laborers and mechanics to be engaged in the Work under this Contract and all deductions, if any, required by law to be made from unpaid wages actually earned by laborers and mechanics so engaged.
- B. Supplementary Conditions section in Construction Documents lists wage determinations required by State Law.
- C. If, after award of Contract, it becomes necessary to employ any person in trade or occupation not classified in wage determinations, such person shall be paid at not less than such rate as shall be determined by Wisconsin Department of Workforce Development. Such approved minimum rate shall be retroactive to time of initial employment of such person in such trade or occupation. Contractor shall notify Department of Contractor's intention to employ persons in trades or occupations not so classified in sufficient time for Department to obtain approved rates for such trades or occupations.
- D. Specified wage rates are minimum rates only, and Department will not consider any claims for additional compensation made by Contractor because of payment by Contractor of any wage rate in excess of applicable rate contained in this Contract. Contractor shall adjust any disputes in regard to payment of wages in excess of those specified in this Contract.
- E. Submit required affidavit(s) to Department of Public Works, Highway & Transportation, as requested and with final application for payment for work under said contract. Affidavit(s) shall clearly indicate name, trade or occupation, and paid wages of every laborer, workman or mechanic employed by Contractor and all subcontractors during billing period including accurate record of number of hours worked by each employee and actual wages paid as stipulated in Wisconsin Statute 66.0903. If Wisconsin Prevailing Wage Rate Determination is required for this Work, use "Prime Contractor Affidavit of Compliance With Prevailing Wage Rate Determination" and "Agent or Subcontractor Affidavit of Compliance With Prevailing Wage Rate Determination" (if applicable). If Wisconsin Prevailing Wage Rate Determination is not required for this Work, use "Dane County, Wisconsin Contractor Wage Affidavit". Forms of such affidavits are included in Supplementary Conditions.

48. CLAIMS

- A. No claim may be made until Department's Assistant Public Works Director has reviewed Architect / Engineer's decision as provided for in Article 35 of General Conditions of Contract. If any claim remains unresolved after such review by Department's Associate Public Works Director, claim may be filed under Wisconsin Statute 893.80. Work shall progress during period of any dispute or claim. Unless specifically agreed between parties, venue will be in Dane County, Wisconsin.

49. ANTITRUST AGREEMENT

- A. Contractor and County recognize that in actual economic practice, overcharges resulting from antitrust violations are in fact usually borne by County. Therefore, Contractor hereby assigns to County any and all claims for such overcharges as to goods and materials purchased in connection with this Contract, except as to overcharges which result from antitrust violations commencing after price is established under this Contract and any change order thereto.

50. INSURANCE

- A. Contractor Carried Insurance:
1. Contractor shall not commence work under this Contract until Contractor has obtained all insurance required under this Article and has provided evidence of such insurance to Risk Manager, 425 City-County Building, 210 Martin Luther King Jr. Blvd., Madison, WI 53703. Contractor shall not allow any subcontractor to commence work until insurance required of subcontractor has been so obtained and approved. Company providing insurance must be licensed to do business in Wisconsin.
 2. Worker's Compensation Insurance:
 - a) Contractor shall procure and shall maintain during life of this Contract, Worker's Compensation Insurance as required by statute for all of Contractor's employees engaged in work at site of project under this Contract and, in case of any such work sublet, Contractor shall require subcontractor similarly to provide Worker's Compensation Insurance for all of latter's employees to be engaged in such work unless such employees are covered by protection afforded by Contractor's Worker's Compensation Insurance.
 - b) If any claim of employees engaged in hazardous work on project under this Contract is not protected under Worker's Compensation Statute, Contractor shall provide and shall cause each subcontractor to provide adequate Employer's Liability Insurance for protection of such of Contractor's employees as are not otherwise protected.
 3. Contractor's Public Liability and Property Damage Insurance:
 - a) Contractor shall procure and maintain during life of this Contract, Contractor's Public Liability Insurance and Contractor's Property Damage Insurance in amount not less than \$1,000,000 bodily injury, including accidental death, to any one person, and subject to same limit for each person, in amount not less than \$1,000,000 on account of one accident, and Contractor's Property Damage Insurance in amount not less than \$1,000,000 or combined single limit of at least \$1,000,000 with excess coverage over and above general liability in amount not less than \$5,000,000. Contractor shall add "Dane County" as additional insured for each project.
 - b) Contractor's Public Liability and Property Damage Insurance shall include Products, Completed Operation, and Contractual Liability under Insurance Contract. "Contractor shall in all instances save, defend, indemnify and hold harmless County and Architect / Engineer against all claims, demands, liabilities, damages or any other costs which may accrue in prosecution of the Work and that Contractor will save, defend, indemnify and hold harmless County and Architect / Engineer from all damages caused by or as result of Contractor's operations" and each shall be listed as additional insured on Contractor's and sub-contractors' insurance policies.

- c) Obligations of Contractor under Article 48.A.2)b) shall not extend to liability of Architect / Engineer, agents or employees thereof, arising out of:
 - 1) Preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications; or
 - 2) giving of or failure to give directions or instructions by Architect / Engineer, agents or employees thereof provided such giving or failure to give is primary cause of injury or damage.
- d) Contractor shall procure and shall maintain during life of this Contract, Comprehensive Automobile Liability Insurance covering owned, non-owned and hired automobiles for limits of not less than \$1,000,000 each accident single limit, bodily injury and property damage combined with excess coverage over and above general liability in amount not less than \$5,000,000.
- e) Contractor shall either:
 - 1) Require each subcontractor to procure and to maintain during life of subcontract, subcontractor's Public Liability Property Damage Insurance, and Comprehensive Automobile Liability Insurance of type and in same amount specified in preceding paragraphs; or
 - 2) Insure activities of subcontractors in Contractor's own policy.
- 4. Scope of Insurance and Special Hazards: Insurance required under Article 48.A.2 hereof shall provide adequate protection for Contractor and subcontractors, respectively, against damage claims which may arise from operations under this Contract, whether such operation be by insured or by anyone directly or indirectly employed by insured and also against any of special hazards which may be encountered in performance of this Contract as enumerated in Supplementary Conditions.
- 5. Proof of Carriage of Insurance: Contractor shall furnish Risk Manager with certificates showing type, amount, class of operations covered, effective dates, dates of expiration of policies and "Dane County" listed as additional insured. Such certificates shall also contain (substantially) following statement: "Insurance covered by this certificate will not be canceled or materially altered, except after ten (10) days written notice has been received by Risk Manager."

B. Builder's Risk:

- 1. County shall provide Builder's Risk policy. Terms of this policy will be made available by County's Risk Manager, upon Contractor's request. By executing this Contract, Contractor warrants it is familiar with terms of said policy.

C. Indemnification / Hold Harmless:

- 1. Contractor shall indemnify, hold harmless and defend Dane County, its boards, commissions, agencies, officers, employees and representatives from and against all claims, damages, losses and expenses including attorneys' fees arising out of or resulting from performance of the Work, provided that any 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) including loss of use resulting therefrom, and is caused in whole or in part by any act or omission of Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, regardless of whether or not it is caused in part by part indemnified hereunder.
- 2. In any and all claims against Dane County, its boards, commissions, agencies, officers, employees and representatives or by any employee of Contractor, any subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable, indemnification obligation under this Contract shall not be limited in any way by any limitation on amount or type of damages, compensation or benefits payable by or for Contractor or any subcontractor under worker's compensation acts, disability benefits or other employee benefit acts.

3. Obligations of Contractor under this Contract shall not extend to liability of Architect / Engineer, its agents or employees arising out of:
 - a) Preparation or approval of maps, drawings, opinion, reports, surveys, change orders, designs or specifications; or
 - b) Giving of or failure to give directions or instruction by Architect / Engineer, its agents or employees provided such giving or failure to give is primary cause of injury or damage.
4. Dane County shall not be liable to Contractor for damages or delays resulting from work by third parties or by injunctions or other restraining orders obtained by third parties.

51. WISCONSIN LAW CONTROLLING


- A. It is expressly understood and agreed to by parties hereto that in event of any disagreement or controversy between parties, Wisconsin law shall be controlling.

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SUPPLEMENTARY CONDITIONS

1. APPLICATION & CERTIFICATE FOR PAYMENT

- A. Every contractor engaged in performance of any contract for Department of Public Works, Highway & Transportation shall submit partial and final Application & Certificate for Payment for work under said contract. Form shall provide similar information as shown on AIA G702™ and G703™ forms (samples shown below). Forms shall be submitted to Project Architect for approval.


AIA Document G702™ – 1992

Application and Certificate for Payment

TO OWNER:	PROJECT:	APPLICATION NO.:	Distribution to:
		PERIOD TO:	OWNER <input type="checkbox"/>
FROM CONTRACTOR:	VIA ARCHITECT:	CONTRACT FOR:	ARCHITECT <input type="checkbox"/>
		CONTRACT DATE:	CONTRACTOR <input type="checkbox"/>
		PROJECT NOS.:	FIELD <input type="checkbox"/>
			OTHER <input type="checkbox"/>

CONTRACTOR'S APPLICATION FOR PAYMENT
Application is made for payment, as shown below, in connection with the Contract. Continuation Sheet, AIA Document G703, is attached.

1. ORIGINAL CONTRACT SUM \$ _____

2. Net change by Change Orders \$ _____

3. CONTRACT SUM TO DATE (Line 1 + 2) \$ _____

4. TOTAL COMPLETED & STORED TO DATE (Column G on G703) \$ _____

5. RETAINAGE

a. % of Completed Work (Column D + E on G703) \$ _____

b. % of Stored Material (Column F on G703) \$ _____

Total Retainage (Lines 5a + 5b) Total in Column I of G703 \$ _____

6. TOTAL EARNED LESS RETAINAGE \$ _____
(Line 4 less Line 5 Total)

7. LESS PREVIOUS CERTIFICATES FOR PAYMENT \$ _____
(Line 6 from prior Certificates)

8. CURRENT PAYMENT DUE \$ _____
(Line 6 less Line 7)

9. BALANCE TO FINISH, INCLUDING RETAINAGE \$ _____
(Line 6 less Line 8)

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts here shown paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payments shown herein are law due.

CONTRACTOR:
 By: _____ Date: _____
 Name of _____
 County of _____
 Subscribed and sworn to before me this _____ day of _____
 Notary Public
 My Commission expires _____

ARCHITECT'S CERTIFICATE FOR PAYMENT
In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED \$ _____
(Attach explanation of amount certified differs from the amount applied. Detail all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:
 By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	\$	\$
Total approved this Month	\$	\$
TOTALS	\$	\$
NET CHANGES by Change Order	\$	\$

AIA Document G702™ – 1992 Copyright © 1993, 1995, 1997, 1975, 1985 and 1992 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. Photographs are permitted to reproduce the 175 copies of this document when completed. To report copyright violations of AIA Contract Documents, e-mail The American Institute of Architects' legal counsel, copyright@aia.org.

2. PREVAILING WAGE RATE DETERMINATION

- A. These supplements shall modify, delete, and / or add to General Conditions of Contract. Where any article, paragraph, or subparagraph in General Conditions of Contract is supplemented by one of these paragraphs, provisions of such article, paragraph, or subparagraph shall remain in effect and supplementary provisions shall be considered as added thereto. Where any article, paragraph, or subparagraph in General Conditions of Contract is amended, voided, or superseded by any of these paragraphs, provisions of such article, paragraph, or subparagraph not so amended, voided, or superseded shall remain in effect.
 - 1. General Conditions of Contract Article 47, "Minimum Wages", paragraph B. Following Prevailing Wage Rate Determination No. 201301930 is added to General Conditions of Contract.

- B. These State of Wisconsin forms, hereinafter set forth in this section, shall be filled out and submitted to Department of Public Works, Highway & Transportation:
 - 1. Disclosure of Ownership (ERD-7777)
 - 2. Prime Contractor Affidavit of Compliance With Prevailing Wage Rate Determination (ERD-5724)
 - 3. List of Agents and Subcontractors (Page 2 - ERD-5724)
 - 4. Agent or Subcontractor Affidavit of Compliance With Prevailing Wage Rate Determination (ERD-10584)
 - 5. List of Agents and Subcontractors (Page 2 - ERD-10584)
 - 6. Request To Employ Subjourney person (ERD-10880)

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State of Wisconsin Department of Workforce Development Equal Rights Division	DEPARTMENTAL ORDER
ISSUE DATE: 7/11/2013	
PROJECT:	
ALLIANT ENERGY CENTER PAVILIONS MADISON TOWN, DANE COUNTY, WI Determination No. 201301930 [Owner Project No. 313072]	
PROJECT OWNER:	REQUESTER:
ROBERT NEBEL, ASSISTANT PUBLIC WORKS DIRECTOR DANE COUNTY 1919 ALLIANT ENERGY CENTER WAY MADISON, WI 53713	ROBERT NEBEL, ASSISTANT PUBLIC WORKS DIRECTOR DANE COUNTY 1919 ALLIANT ENERGY CENTER WAY MADISON, WI 53713
ADDITIONAL CONTACT:	
RICHARD GILBERTSEN, SENIOR PROJECT MANAGER STRANG, INC. 6411 MINERAL POINT ROAD MADISON, WI 53705	NOTE: The Requester must provide a copy of this Project Determination and enclosures to the Project Owner and Additional Contact.
<p>The department received an application for prevailing wage rate determination for the above-captioned project. The department conducted a survey to determine the prevailing wage rate for the trade(s) or occupation(s) needed to complete the project. The survey's findings appear in the attached project determination.</p> <p>If you believe that the wage rate for any trade or occupation does not accurately reflect the prevailing wage rate in the city, village or town where the project is located, you may ask the department to conduct an administrative review of such wage rate. You must submit this request in writing within 30 days from the date indicated above. Additionally, your request must include wage rate information from at least three similar projects in the city, village or town where the proposed project is located and on which some work has been performed by the contested trade(s) during the current survey period and was previously considered by the department in issuing the attached determination. See DWD 290.10 of the Wisconsin Administrative Code and either s. 66.0903(3)(br), Stats., or s. 103.49(3)(c), Stats., for a complete explanation of the administrative review process.</p> <p>Enclosures</p>	
<p>It is hereby ordered that the prevailing wage rates set forth in the attached project determination shall only be applicable to the above referenced project. This order is a FINAL ORDER of the department unless a timely request for an administrative review is filed with the department.</p> <p>ISSUED BY:</p> <p style="text-align: center;"> Equal Rights Division Labor Standards Bureau Construction Wage Standards Section P.O. Box 8928, Madison, WI 53708-8928 (608)266-6861 </p> <p style="text-align: center;"> Web Site: http://dwd.wisconsin.gov/er/ </p>	

PREVAILING WAGE RATE DETERMINATION

Issued by the State of Wisconsin
Department of Workforce Development
Pursuant to s. 66.0903, Wis. Stats.
Issued On: 7/11/2013

DETERMINATION NUMBER: 201301930

EXPIRATION DATE: Prime Contracts MUST Be Awarded or Negotiated On Or Before 1/7/2014. If NOT, You MUST Reapply.

PROJECT NAME: ALLIANT ENERGY CENTER PAVILIONS
PROJECT NO: 313072

PROJECT LOCATION: MADISON TOWN, DANE COUNTY, WI

CONTRACTING AGENCY: STRANG, INC.
LOCAL GOVTL UNIT: DANE COUNTY

CLASSIFICATION:	Contractors are responsible for correctly classifying their workers. Either call the Department of Workforce Development (DWD) with trade or classification questions or consult DWD's Dictionary of Occupational Classifications & Work Descriptions on the DWD website at: dwd.wisconsin.gov/er/prevailing_wage_rate/Dictionary/dictionary_main.htm .
OVERTIME:	Time and one-half must be paid for all hours worked: <ul style="list-style-type: none">- over 10 hours per day on prevailing wage projects- over 40 hours per calendar week- Saturday and Sunday- on all of the following holidays: January 1; the last Monday in May; July 4; the 1st Monday in September; the 4th Thursday in November; December 25;- The day before if January 1, July 4 or December 25 falls on a Saturday;- The day following if January 1, July 4 or December 25 falls on a Sunday. Apply the time and one-half overtime calculation to whichever is higher between the Hourly Basic Rate listed on this project determination or the employee's regular hourly rate of pay. Add any applicable Premium or DOT Premium to the Hourly Basic Rate before calculating overtime. A DOT Premium (discussed below) may supersede this time and one-half requirement.
FUTURE INCREASE:	When a specific trade or occupation requires a future increase, you MUST add the full hourly increase to the "TOTAL" on the effective date(s) indicated for the specific trade or occupation.
PREMIUM PAY:	If indicated for a specific trade or occupation, the full amount of such pay MUST be added to the "HOURLY BASIC RATE OF PAY" indicated for such trade or occupation, whenever such pay is applicable.
DOT PREMIUM:	This premium only applies to highway and bridge projects owned by the Wisconsin Department of Transportation and to the project type heading "Airport Pavement or State Highway Construction." DO NOT apply the premium calculation under any other project type on this determination.
APPRENTICES:	Pay apprentices a percentage of the applicable journey person's hourly basic rate of pay and hourly fringe benefit contributions specified in this determination. Obtain the appropriate percentage from each apprentice's contract or indenture.
SUBJOURNEY:	Subjourney wage rates may be available for some of the trades or occupations indicated below with the exception of laborers, truck drivers and heavy equipment operators. Any employer interested in using a subjourney classification on this project MUST complete Form ERD-10880 and request the applicable wage rate from the Department of Workforce Development PRIOR to using the subjourney worker on this project.

This document **MUST BE POSTED** by the **CONTRACTING AGENCY** in at least one conspicuous and easily accessible place **on the site of the project**. A local governmental unit may post this document at the place normally used to post public notices if there is no common site on the project. This document **MUST** remain posted during the entire time any worker is employed on the project and **MUST** be physically incorporated into the specifications and all contracts and subcontracts. If you have any questions, please write to the Equal Rights Division, Labor Standards Bureau, P.O. Box 8928, Madison, Wisconsin 53708 or call (608) 266-6861.

The following statutory provisions apply to local governmental unit projects of public works and are set forth below pursuant to the requirements of s. 66.0903(8), Stats.

s. 66.0903 (1) (f) & s. 103.49 (1) (c) "PREVAILING HOURS OF LABOR" for any trade or occupation in any area means 10 hours per day and 40 hours per week and may not include any hours worked on a Saturday or Sunday or on any of the following holidays:

1. January 1.
2. The last Monday in May.
3. July 4.
4. The first Monday in September.
5. The 4th Thursday in November.
6. December 25.
7. The day before if January 1, July 4 or December 25 falls on a Saturday.
8. The day following if January 1, July 4 or December 25 falls on a Sunday.

s. 66.0903 (10) RECORDS; INSPECTION; ENFORCEMENT.

(a) Each contractor, subcontractor, or contractor's or subcontractor's agent performing work on a project of public works that is subject to this section shall keep full and accurate records clearly indicating the name and trade or occupation of every person performing the work described in sub. (4) and an accurate record of the number of hours worked by each of those persons and the actual wages paid for the hours worked.

s. 66.0903 (11) LIABILITY AND PENALTIES.

(a) 1. Any contractor, subcontractor, or contractor's or subcontractor's agent who fails to pay the prevailing wage rate determined by the department under sub. (3) or who pays less than 1.5 times the hourly basic rate of pay for all hours worked in excess of the prevailing hours of labor is liable to any affected employee in the amount of his or her unpaid wages or his or her unpaid overtime compensation and in an additional amount as liquidated damages as provided under subd. 2., 3., whichever is applicable.

2. If the department determines upon inspection under sub. (10) (b) or (c) that a contractor, subcontractor, or contractor's or subcontractor's agent has failed to pay the prevailing wage rate determined by the department under sub. (3) or has paid less than 1.5 times the hourly basic rate of pay for all hours worked in excess of the prevailing hours of labor, the department shall order the contractor to pay to any affected employee the amount of his or her unpaid wages or his or her unpaid overtime compensation and an additional amount equal to 100 percent of the amount of those unpaid wages or that unpaid overtime compensation as liquidated damages within a period specified by the department in the order.

3. In addition to or in lieu of recovering the liability specified in subd. 1. as provided in subd. 2., any employee for and in behalf of that employee and other employees similarly situated may commence an action to recover that liability in any court of competent jurisdiction. If the court finds that a contractor, subcontractor, or contractor's or subcontractor's agent has failed to pay the prevailing wage rate determined by the department under sub. (3) or has paid less than 1.5 times the hourly basic rate of pay for all hours worked in excess of the prevailing hours of labor, the court shall order the contractor, subcontractor, or agent to pay to any affected employee the amount of his or her unpaid wages or his or her unpaid overtime compensation and an additional amount equal to 100 percent of the amount of those unpaid wages or that unpaid overtime compensation as liquidated damages.

5. No employee may be a party plaintiff to an action under subd. 3. unless the employee consents in writing to become a party and the consent is filed in the court in which the action is brought. Notwithstanding s. 814.04 (1), the court shall, in addition to any judgment awarded to the plaintiff, allow reasonable attorney fees and costs to be paid by the defendant.

BUILDING OR HEAVY CONSTRUCTION

Includes sheltered enclosures with walk-in access for the purpose of housing persons, employees, machinery, equipment or supplies and non-sheltered work such as canals, dams, dikes, reservoirs, storage tanks, etc. A sheltered enclosure need not be "habitable" in order to be considered a building. The installation of machinery and/or equipment, both above and below grade level, does not change a project's character as a building. On-site grading, utility work and landscaping are included within this definition. Residential buildings of four (4) stories or less, agricultural buildings, parking lots and driveways are NOT included within this definition.

SKILLED TRADES

<u>CODE</u>	<u>TRADE OR OCCUPATION</u>	<u>HOURLY BASIC RATE OF PAY</u>	<u>HOURLY FRINGE BENEFITS</u>	<u>TOTAL</u>
		\$	\$	\$
101	Acoustic Ceiling Tile Installer	30.16	15.31	45.47
102	Boilermaker	31.09	24.52	55.61
103	Bricklayer, Blocklayer or Stonemason Future Increase(s): Add \$.80 on 6/1/2013 Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	32.01	17.35	49.36
104	Cabinet Installer	30.16	15.31	45.47
105	Carpenter	30.16	15.31	45.47
106	Carpet Layer or Soft Floor Coverer	30.16	15.31	45.47
107	Cement Finisher	31.48	13.19	44.67
108	Drywall Taper or Finisher	25.10	14.78	39.88
109	Electrician Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	32.94	18.80	51.74
110	Elevator Constructor	44.94	23.84	68.78
111	Fence Erector	22.50	3.98	26.48
112	Fire Sprinkler Fitter	36.07	18.60	54.67
113	Glazier	37.13	12.32	49.45
114	Heat or Frost Insulator	33.93	23.26	57.19
115	Insulator (Batt or Blown)	27.47	19.16	46.63
116	Ironworker	30.90	19.11	50.01
117	Lather	30.16	15.31	45.47
118	Line Constructor (Electrical)	37.05	16.94	53.99

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked				
CODE	TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
		\$	\$	\$
119	Marble Finisher	20.00	0.00	20.00
120	Marble Mason	32.01	16.85	48.86
121	Metal Building Erector	18.05	8.08	26.13
122	Millwright	31.76	15.36	47.12
123	Overhead Door Installer	13.50	0.00	13.50
124	Painter	24.80	14.78	39.58
125	Pavement Marking Operator	30.00	0.00	30.00
126	Piledriver	30.66	15.31	45.97
127	Pipeline Fuser or Welder (Gas or Utility)	30.18	19.29	49.47
129	Plasterer	30.03	16.36	46.39
130	Plumber	36.17	15.37	51.54
132	Refrigeration Mechanic	42.45	16.71	59.16
133	Rofer or Waterproofer	30.40	2.23	32.63
134	Sheet Metal Worker	34.23	20.19	54.42
135	Steamfitter	41.20	16.28	57.48
137	Teledata Technician or Installer Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	21.89	11.85	33.74
138	Temperature Control Installer	41.20	16.21	57.41
139	Terrazzo Finisher Future Increase(s): Add \$.80 on 6/1/2013	26.57	16.50	43.07
140	Terrazzo Mechanic	29.51	17.63	47.14
141	Tile Finisher Future Increase(s): Add \$.80/hr on 6/1/2013.	23.77	16.50	40.27
142	Tile Setter Future Increase(s): Add \$.80/hr on 6/1/2013.	29.71	16.50	46.21
143	Tuckpointer, Caulker or Cleaner Future Increase(s): Add \$.80 on 6/1/2013 Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	32.01	17.35	49.36

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
144	Underwater Diver (Except on Great Lakes)	34.16	15.31	49.47
146	Well Driller or Pump Installer Future Increase(s): Add \$.20/hr on 06/01/2013.	25.32	15.45	40.77
147	Siding Installer	37.20	17.01	54.21
150	Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	28.24	15.10	43.34
151	Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY	29.64	14.64	44.28
152	Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	25.94	13.57	39.51
153	Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	24.08	12.96	37.04
154	Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	24.00	11.57	35.57

TRUCK DRIVERS

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
201	Single Axle or Two Axle	31.89	17.98	49.87
203	Three or More Axle	18.00	11.45	29.45
204	Articulated, Euclid, Dumptor, Off Road Material Hauler Future Increase(s): Add \$1/hr on 6/2/2013.	32.39	18.46	50.85
205	Pavement Marking Vehicle	20.85	11.02	31.87
207	Truck Mechanic	18.00	11.45	29.45

LABORERS

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
301	General Laborer Future Increase(s): Add \$.75/hr. on 06/03/2013 Premium Increase(s): Add \$1.00/hr for certified welder; Add \$.25/hr for mason tender	24.19	13.90	38.09
302	Asbestos Abatement Worker	18.00	0.00	18.00
303	Landscaper	15.00	3.90	18.90
310	Gas or Utility Pipeline Laborer (Other Than Sewer and Water)	20.94	12.65	33.59

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	<u>TOTAL</u>
<u>CODE</u>	<u>TRADE OR OCCUPATION</u>	\$	\$	\$
311	Fiber Optic Laborer (Outside, Other Than Concrete Encased) Premium Increase(s): DOT PREMIUMS: Pay two times the hourly basic rate on New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	18.31	12.67	30.98
314	Railroad Track Laborer	23.41	6.91	30.32
315	Final Construction Clean-Up Worker	24.69	12.90	37.59

**HEAVY EQUIPMENT OPERATORS
SITE PREPARATION, UTILITY OR LANDSCAPING WORK ONLY**

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	<u>TOTAL</u>
<u>CODE</u>	<u>TRADE OR OCCUPATION</u>	\$	\$	\$
501	Air Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Asphalt Milling Machine; Boring Machine (Directional, Horizontal or Vertical); Backhoe (Track Type) Having a Mfgr's Rated Capacity of 130,000 Lbs. or Over; Backhoe (Track Type) Having a Mfgr's Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Bulldozer or Endloader (Over 40 hp); Compactor (Self-Propelled 85 Ft Total Drum Width & Over, or Tractor Mounted, Towed & Light Equipment); Concrete Batch Plant, Batch Hopper; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Crane, Shovel, Dragline, Clamshells; Forklift (Machinery Moving or Steel Erection, 25 Ft & Over); Gradall (Cruz-Aire Type); Grader or Motor Patrol; Master Mechanic; Mechanic or Welder; Robotic Tool Carrier (With or Without Attachments); Scraper (Self Propelled or Tractor Drawn) 5 cu yds or More Capacity; Tractor or Truck Mounted Hydraulic Backhoe; Tractor or Truck Mounted Hydraulic Crane (10 Tons or Under); Tractor (Scraper, Dozer, Pusher, Loader); Trencher (Wheel Type or Chain Type Having Over 8 Inch Bucket). Future Increase(s): Add \$1/hr on 6/2/2013.	32.39	18.46	50.85
502	Backfiller; Broom or Sweeper; Bulldozer or Endloader (Under 40 hp); Environmental Burner; Forestry Equipment, Timbco, Tree Shear, Tub Grinder, Processor; Jeep Digger; Screed (Milling Machine); Skid Rig; Straddle Carrier or Travel Lift; Stump Chipper; Trencher (Wheel Type or Chain Type Having 8 Inch Bucket & Under). Future Increase(s): Add \$1/hr on 6/2/2013.	32.39	18.46	50.85
503	Air Compressor (&/or 400 CFM or Over); Augers (Vertical & Horizontal); Compactor (Self-Propelled 84 Ft Total Drum Width & Under, or Tractor Mounted, Towed & Light Equipment); Crusher, Screening or Wash Plant; Farm or Industrial Type Tractor; Forklift; Generator (&/or 150 KW or Over); Greaser; High Pressure Utility Locating Machine (Daylighting Machine); Mulcher; Oiler; Post Hole Digger or Driver; Pump (3 Inch or Over) or Well Points; Refrigeration Plant or Freeze Machine; Rock, Stone Breaker; Skid Steer Loader (With or Without Attachments); Vibratory Hammer or Extractor, Power Pack. Future Increase(s): Add \$1/hr on 6/2/2013.	30.32	18.46	48.78

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
504	Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.	37.45	19.45	56.90
505	Work Performed on the Great Lakes Including Crane or Backhoe Operator; Assistant Hydraulic Dredge Engineer; Hydraulic Dredge Leverman or Diver's Tender; Mechanic or Welder; 70 Ton & Over Tug Operator. Future Increase(s): Add \$2.19/hr on 01/01/2013; Add \$2.00/hr on 01/01/2014. Premium Increase(s): Add \$.50/hr for Friction Crane, Lattice Boom or Crane Certification (CCO).	38.80	20.17	58.97
506	Work Performed on the Great Lakes Including Deck Equipment Operator or Machineryman (Maintains Cranes Over 50 Tons or Backhoes 115,000 Lbs. or More); Tug, Launch or Loader, Dozer or Like Equipment When Operated on a Barge, Breakwater Wall, Slip, Dock or Scow, Deck Machinery. Future Increase(s): Add \$2.08/hr on 01/01/2013; Add \$2.00/hr on 01/01/2014.	34.50	20.04	54.54
507	Work Performed on the Great Lakes Including Deck Equipment Operator, Machineryman or Fireman (Operates 4 Units or More or Maintains Cranes 50 Tons or Under or Backhoes 115,000 Lbs. or Under); Deck Hand, Deck Engineer or Assistant Tug Operator; Off Road Trucks - Great Lakes ONLY. Future Increase(s): Add \$1.88/hr on 01/01/2013; Add \$2.00/hr on 01/01/2014.	28.70	19.86	48.56

**HEAVY EQUIPMENT OPERATORS
EXCLUDING SITE PREPARATION, UTILITY, PAVING LANDSCAPING WORK**

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
508	Boring Machine (Directional); Crane, Tower Crane, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons, Self-Erecting Tower Crane With a Lifting Capacity of Over 4,000 Lbs., Crane With Boom Dollies; Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 176 Ft or Over; Master Mechanic. Future Increase(s): Add \$1/hr on 6/2/2013. Premium Increase(s): Add \$.50/hr for >200 Ton / Add \$1/hr at 300 Ton / Add \$1.50 at 400 Ton / Add \$2/hr at 500 Ton & Over.	35.12	18.46	53.58

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
509	Backhoe (Track Type) Having a Mfgr's Rated Capacity of 130,000 Lbs. or Over; Boring Machine (Horizontal or Vertical); Caisson Rig; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under, Self-Erecting Tower Crane With A Lifting Capacity Of 4,000 Lbs. & Under; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 175 Ft or Under; Pile Driver; Versi Lifts, Tri-Lifts & Gantrys (20,000 Lbs. & Over). Future Increase(s): Add \$1/hr on 6/2/2013. Premium Increase(s): Add \$.25/hr for all >45 Ton lifting capacity cranes.	34.12	18.46	52.58
510	Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Concrete Bump Cutter, Grinder, Planing or Grooving Machine; Concrete Laser/Screed; Concrete Paver (Slipform); Concrete Pump (Over 46 Meter), Concrete Conveyor (Rotec or Bidwell Type); Concrete Slipform Placer Curb & Gutter Machine; Concrete Spreader & Distributor; Dredge (NOT Performing Work on the Great Lakes); Forklift (Machinery Moving or Steel Erection, 25 Ft & Over); Gradall (Cruz-Aire Type); Hydro-Blaster (10,000 PSI or Over); Milling Machine; Skid Rig; Traveling Crane (Bridge Type).	32.42	17.97	50.39
511	Air, Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Bulldozer or Endloader (Over 40 hp); Compactor (Self-Propelled 85 Ft Total Drum Width & Over, or Tractor Mounted, Towed & Light Equipment); Concrete Pump (46 Meter & Under), Concrete Conveyor (Rotec or Bidwell Type); Crane (Carry Deck, Mini) or Truck Mounted Hydraulic Crane (10 Tons or Under); Environmental Burner; Gantrys (Under 20,000 Lbs.); Grader or Motor Patrol; High Pressure Utility Locating Machine (Daylighting Machine); Manhoist; Material or Stack Hoist; Mechanic or Welder; Railroad Track Rail Leveling Machine, Tie Placer, Extractor, Tamper, Stone Leveler or Rehabilitation Equipment; Roller (Over 5 Ton); Scraper (Self Propelled or Tractor Drawn) 5 cu yd or More Capacity; Screed (Milling Machine); Sideboom; Straddle Carrier or Travel Lift; Tining or Curing Machine; Tractor (Scraper, Dozer, Pusher, Loader); Tractor or Truck Mounted Hydraulic Backhoe; Tractor or Truck Mounted Hydraulic Crane (10 Tons or Under); Trencher (Wheel Type or Chain Type Having Over 8-Inch Bucket). Future Increase(s): Add \$1/hr on 6/2/2013.	32.39	18.46	50.85
512	Backfiller; Broom or Sweeper; Bulldozer or Endloader (Under 40 hp); Compactor (Self-Propelled 84 Ft Total Drum Width & Under, or Tractor Mounted, Towed & Light Equipment); Concrete Batch Plant, Batch Hopper; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Concrete Conveyor System; Concrete Finishing Machine (Road Type); Fireman (Pile Driver & Derrick NOT Performing Work on the Great Lakes); Grout Pump; Hoist (Tugger, Automatic); Industrial Locomotives; Jeep Digger; Lift Slab Machine; Mulcher; Roller (Rubber Tire, 5 Ton or Under); Screw or Gypsum Pumps; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); Stump Chipper; Trencher (Wheel Type or Chain Type Having 8-Inch Bucket & Under); Winches & A-Frames. Future Increase(s): Add \$1/hr on 6/2/2013.	30.32	18.46	48.78

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
513	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Augers (Vertical & Horizontal); Boatmen (NOT Performing Work on the Great Lakes); Boiler (Temporary Heat); Crusher, Screening or Wash Plant; Elevator; Farm or Industrial Type Tractor; Fireman (Asphalt Plant NOT Performing Work on the Great Lakes); Forklift; Generator (&/or 150 KW or Over); Greaser; Heaters (Mechanical); Loading Machine (Conveyor); Oiler; Post Hole Digger or Driver; Prestress Machine; Pump (3 Inch or Over) or Well Points; Refrigeration Plant or Freeze Machine; Robotic Tool Carrier (With or Without Attachments); Rock, Stone Breaker; Skid Steer Loader (With or Without Attachments); Vibratory Hammer or Extractor, Power Pack. Future Increase(s): Add \$1/hr on 6/2/2013.	29.69	18.46	48.15
514	Gas or Utility Pipeline, Except Sewer & Water (Primary Equipment). Future Increase(s): Add \$2/hr on 1/1/2013.	34.89	20.59	55.48
515	Gas or Utility Pipeline, Except Sewer & Water (Secondary Equipment). Future Increase(s): Add \$1.60/hr on 06/01/2013; Add \$1.60/hr on 06/01/2014; Add \$1.65/hr on 06/01/2015.	31.32	17.95	49.27
516	Fiber Optic Cable Equipment Future Increase(s): Add \$1.75/hr on 02/01/2013; Add \$1.75/hr on 02/01/2014	26.69	16.65	43.34

SEWER, WATER OR TUNNEL CONSTRUCTION
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Includes those projects that primarily involve public sewer or water distribution, transmission or collection systems and related tunnel work (excluding buildings).

SKILLED TRADES

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
103	Bricklayer, Blocklayer or Stonemason Future Increase(s): Add \$1.45/hr on 6/01/2013 Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	35.80	16.87	52.67
105	Carpenter Future Increase(s): Add \$.75/hr on 6/3/2013. Add \$1.25/hr on 6/2/2014. Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	32.93	19.81	52.74
107	Cement Finisher Future Increase(s): Add \$1.87 on 6/1/13; Add \$1.87 on 6/1/14; Add \$1.87 on 6/1/15; Add \$1.75 on 6/1/16. Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.40/hr when the Wisconsin Department of Transportation or responsible governing agency requires that work be performed at night under artificial illumination with traffic control and the work is completed after sunset and before sunrise.	32.09	16.13	48.22
109	Electrician Future Increase(s): Add \$1.60/hr on 6/1/2013. Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	32.20	21.71	53.91
111	Fence Erector	22.50	3.98	26.48
116	Ironworker	30.90	19.11	50.01
118	Line Constructor (Electrical)	37.05	16.94	53.99
125	Pavement Marking Operator	28.10	15.00	43.10
126	Piledriver	30.66	15.31	45.97
130	Plumber	36.97	17.66	54.63

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
135	Steamfitter	41.20	16.28	57.48
137	Teledata Technician or Installer	21.26	11.75	33.01
143	Tuckpointer, Caulker or Cleaner	32.01	16.85	48.86
144	Underwater Diver (Except on Great Lakes)	37.45	19.45	56.90
146	Well Driller or Pump Installer	21.00	2.23	23.23
150	Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	28.24	15.10	43.34
151	Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY	29.64	14.64	44.28
152	Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	25.94	13.57	39.51
153	Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	24.08	12.96	37.04
154	Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	21.75	11.90	33.65

TRUCK DRIVERS

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
201	Single Axle or Two Axle	25.87	13.00	38.87
203	Three or More Axle	17.54	13.85	31.39
204	Articulated, Euclid, Dumptor, Off Road Material Hauler	31.89	17.98	49.87
205	Pavement Marking Vehicle	20.85	11.02	31.87
207	Truck Mechanic	17.00	0.00	17.00

LABORERS

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
301	General Laborer Future Increase(s): Add \$.80/hr. on 06/03/2013 Premium Increase(s): Add \$.20 for blaster, bracer, manhole builder, caulker, bottomman and power tool; Add \$.55 for pipelayer; Add \$1.00 for tunnel work 0-15 lbs. compressed air; Add \$2.00 for over 15-30 lbs. compressed air; Add \$3.00 for over 30 lbs. compressed air.	25.53	13.89	39.42
303	Landscaper	26.92	12.51	39.43

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked				
CODE	TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
		\$	\$	\$
304	Flagperson or Traffic Control Person	17.33	15.53	32.86
311	Fiber Optic Laborer (Outside, Other Than Concrete Encased)	17.81	12.22	30.03
314	Railroad Track Laborer	23.41	6.91	30.32

**HEAVY EQUIPMENT OPERATORS
SEWER, WATER OR TUNNEL WORK**

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked				
CODE	TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
		\$	\$	\$
521	Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of 130,000 Lbs. or Over; Caisson Rig; Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 176 Ft or Over; Crane, Tower Crane, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons, Self-Erecting Tower Crane With a Lifting Capacity Of Over 4,000 Lbs., Crane With Boom Dollies; Master Mechanic; Pile Driver. Future Increase(s): Add \$1/hr on 6/2/2013. Premium Increase(s): Add \$.50/hr for >200 Ton / Add \$1/hr at 300 Ton / Add \$1.50 at 400 Ton / Add \$2/hr at 500 Ton & Over.	35.12	18.46	53.58
522	Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Boring Machine (Directional); Concrete Bump Cutter, Grinder, Planing or Grooving Machine; Concrete Laser/Screed; Concrete Paver (Slipform); Concrete Pump (Over 46 Meter), Concrete Conveyor (Rotec or Bidwell Type); Concrete Spreader & Distributor; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 175 Ft or Under; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under, Self-Erecting Tower Crane With a Lifting Capacity of 4,000 Lbs. & Under; Dredge (NOT Performing Work on the Great Lakes); Milling Machine; Skid Rig; Telehandler; Traveling Crane (Bridge Type). Future Increase(s): Add \$1/hr on 6/2/2013.	32.92	18.46	51.38
523	Air Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Boring Machine (Horizontal or Vertical); Bulldozer or Endloader (Over 40 hp); Crane (Carry Deck, Mini) or Truck Mounted Hydraulic Crane (10 Tons or Under); Concrete Pump (46 Meter & Under), Concrete Conveyor (Rotec or Bidwell Type); Concrete Slipform Placer Curb & Gutter Machine; Gradall (Cruz-Aire Type); Grader or Motor Patrol; Hydro-Blaster (10,000 PSI or Over); Manhoist; Material or Stack Hoist; Mechanic or Welder; Roller (Over 5 Ton); Scraper (Self Propelled or Tractor Drawn) 5 cu yd or More Capacity; Screed (Milling Machine); Sideboom; Straddle Carrier or Travel Lift; Tractor (Scraper, Dozer, Pusher, Loader); Tractor or Truck Mounted Hydraulic Backhoe; Tractor or Truck Mounted Hydraulic Crane (10 Tons or Under); Trencher (Wheel Type or Chain Type Having Over 8-Inch Bucket). Future Increase(s): Add \$1/hr on 6/2/2013.	32.39	18.46	50.85

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
524	Backfiller; Broom or Sweeper; Bulldozer or Endloader (Under 40 hp); Compactor (Self-Propelled 85 Ft Total Drum Width & Over, or Tractor Mounted, Towed & Light Equipment); Concrete Batch Plant, Batch Hopper; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Concrete Conveyor System; Concrete Finishing Machine (Road Type); Environmental Burner; Fireman (Pile Driver & Derrick NOT Performing Work on the Great Lakes); Forestry Equipment, Timbco, Tree Shear, Tub Grinder, Processor; Hoist (Tugger, Automatic); Grout Pump; Jeep Digger; Lift Slab Machine; Mulcher; Power Subgrader; Pump (3 Inch or Over) or Well Points; Robotic Tool Carrier (With or Without Attachments); Roller (Rubber Tire, 5 Ton or Under); Screw or Gypsum Pumps; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); Stump Chipper; Tining or Curing Machine; Trencher (Wheel Type or Chain Type Having 8-Inch Bucket & Under); Winches & A-Frames.	31.89	18.11	50.00
525	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Augers (Vertical & Horizontal); Compactor (Self-Propelled 84 Ft Total Drum Width & Under, or Tractor Mounted, Towed & Light Equipment); Crusher, Screening or Wash Plant; Farm or Industrial Type Tractor; Fireman (Asphalt Plant NOT Performing Work on the Great Lakes); Generator (&/or 150 KW or Over); Heaters (Mechanical); High Pressure Utility Locating Machine (Daylighting Machine); Loading Machine (Conveyor); Post Hole Digger or Driver; Refrigeration Plant or Freeze Machine; Rock, Stone Breaker; Skid Steer Loader (With or Without Attachments); Vibratory Hammer or Extractor, Power Pack. Future Increase(s): Add \$1/hr on 6/2/2013.	29.69	18.46	48.15
526	Boiler (Temporary Heat); Forklift; Greaser; Oiler.	30.44	19.10	49.54
527	Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.	37.45	19.45	56.90
528	Work Performed on the Great Lakes Including 70 Ton & Over Tug Operator; Assistant Hydraulic Dredge Engineer; Crane or Backhoe Operator; Hydraulic Dredge Leverman or Diver's Tender; Mechanic or Welder.	37.45	19.45	56.90
529	Work Performed on the Great Lakes Including Deck Equipment Operator or Machineryman (Maintains Cranes Over 50 Tons or Backhoes 115,000 Lbs. or More); Tug, Launch or Loader, Dozer or Like Equipment When Operated on a Barge, Breakwater Wall, Slip, Dock or Scow, Deck Machinery.	27.75	19.15	46.90
530	Work Performed on the Great Lakes Including Deck Equipment Operator; Machineryman or Fireman (Operates 4 Units or More or Maintains Cranes 50 Tons or Under or Backhoes 115,000 Lbs. or Under), Deck Hand, Deck Engineer or Assistant Tug Operator; Off Road Trucks - Great Lakes ONLY.	27.75	19.15	46.90

LOCAL STREET OR MISCELLANEOUS PAVING CONSTRUCTION
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Includes roads, streets, alleys, trails, bridges, paths, racetracks, parking lots and driveways (except residential or agricultural), public sidewalks or other similar projects (excluding projects awarded by the Wisconsin Department of Transportation).

SKILLED TRADES

CODE	TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
		\$	\$	\$
103	Bricklayer, Blocklayer or Stonemason	33.00	15.00	48.00
105	Carpenter	30.16	15.31	45.47
107	Cement Finisher	31.48	15.68	47.16
109	Electrician Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	32.94	18.80	51.74
111	Fence Erector	22.50	3.98	26.48
116	Ironworker	30.90	19.11	50.01
118	Line Constructor (Electrical)	37.05	16.94	53.99
124	Painter	24.80	14.78	39.58
125	Pavement Marking Operator	28.10	15.00	43.10
126	Piledriver	30.66	15.31	45.97
133	Rofer or Waterproofer	30.40	2.23	32.63
137	Teledata Technician or Installer	21.26	11.75	33.01
143	Tuckpointer, Caulker or Cleaner	32.01	16.85	48.86
144	Underwater Diver (Except on Great Lakes)	37.45	19.45	56.90
150	Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	29.64	14.55	44.19
151	Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	30.60	14.64	45.24
152	Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	25.94	13.57	39.51
153	Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	24.08	12.96	37.04
154	Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	21.75	11.90	33.65

TRUCK DRIVERS

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
201	Single Axle or Two Axle	25.87	13.00	38.87
203	Three or More Axle	17.00	0.00	17.00
204	Articulated, Euclid, Dumptor, Off Road Material Hauler Future Increase(s): Add \$1/hr on 6/2/2013.	32.39	18.46	50.85
205	Pavement Marking Vehicle	20.85	11.02	31.87
206	Shadow or Pilot Vehicle	25.87	13.00	38.87
207	Truck Mechanic	17.00	0.00	17.00

LABORERS

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
301	General Laborer	27.20	13.37	40.57
303	Landscaper	18.25	1.11	19.36
304	Flagperson or Traffic Control Person	17.33	15.53	32.86
311	Fiber Optic Laborer (Outside, Other Than Concrete Encased)	17.81	12.22	30.03
314	Railroad Track Laborer	23.41	6.91	30.32

**HEAVY EQUIPMENT OPERATORS
CONCRETE PAVEMENT OR BRIDGE WORK**

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
541	<p>Crane, Tower Crane, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons, Self-Erecting Tower Crane With a Lifting Capacity Of Over 4,000 Lbs., Crane With Boom Dollies; Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 176 Ft or Over; Master Mechanic.</p> <p>Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14.</p> <p>Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm.</p>	35.22	19.90	55.12
542	<p>Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of 130,000 Lbs. or Over; Caisson Rig; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under, Self-Erecting Tower Crane With a Lifting Capacity of 4,000 Lbs. & Under; Crane, Tower Crane Portable Tower, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 175 Ft or Under; Dredge (NOT Performing Work on the Great Lakes); Licensed Boat Pilot (NOT Performing Work on the Great Lakes); Pile Driver.</p> <p>Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14.</p> <p>Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm.</p>	34.72	19.90	54.62

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
543	<p>Air Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Automatic Subgrader (Concrete); Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Boring Machine (Directional, Horizontal or Vertical); Bridge (Bidwell) Paver; Bulldozer or Endloader; Concrete Batch Plant, Batch Hopper; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Concrete Bump Cutter, Grinder, Planing or Grooving Machine; Concrete Conveyor System; Concrete Laser/Screed; Concrete Paver (Slipform); Concrete Pump, Concrete Conveyor (Rotec or Bidwell Type); Concrete Slipform Placer Curb & Gutter Machine; Concrete Spreader & Distributor; Crane (Carry Deck, Mini) or Truck Mounted Hydraulic Crane (10 Tons or Under); Crane With a Lifting Capacity of 25 Tons or Under; Forestry Equipment, Timbco, Tree Shear, Tub Grinder, Processor; Gradall (Cruz-Aire Type); Grader or Motor Patrol; Grout Pump; Hydro-Blaster (10,000 PSI or Over); Loading Machine (Conveyor); Manhoist; Material or Stack Hoist; Mechanic or Welder; Milling Machine; Post Hole Digger or Driver; Scraper (Self Propelled or Tractor Drawn) 5 cu yds or More Capacity; Shoulder Widener; Sideboom; Skid Rig; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); Straddle Carrier or Travel Lift; Tractor (Scraper, Dozer, Pusher, Loader); Tractor or Truck Mounted Hydraulic Backhoe; Trencher (Wheel Type or Chain Type); Tube Finisher; Tugger (NOT Performing Work on the Great Lakes); Winches & A-Frames.</p> <p>Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14.</p> <p>Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm.</p>	34.22	19.90	54.12
544	<p>Backfiller; Belting, Burlap, Texturing Machine; Broom or Sweeper; Compactor (Self-Propelled or Tractor Mounted, Towed & Light Equipment); Concrete Finishing Machine (Road Type); Environmental Burner; Farm or Industrial Type Tractor; Fireman (Pile Driver & Derrick NOT Performing Work on the Great Lakes); Forklift; Greaser; Jeep Digger; Joint Sawyer (Multiple Blade); Launch (NOT Performing Work on the Great Lakes); Lift Slab Machine; Mechanical Float; Mulcher; Power Subgrader; Robotic Tool Carrier (With or Without Attachments); Self Propelled Chip Spreader; Shouldering Machine; Skid Steer Loader (With or Without Attachments); Telehandler; Tining or Curing Machine.</p> <p>Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14.</p> <p>Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm.</p>	33.96	19.90	53.86

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
545	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Automatic Belt Conveyor & Surge Bin; Boiler (Temporary Heat); Concrete Proportioning Plant; Crusher, Screening or Wash Plant; Generator (&/or 150 KW or Over); Heaters (Mechanical); High Pressure Utility Locating Machine (Daylighting Machine); Mudjack; Oiler; Prestress Machine; Pug Mill; Pump (3 Inch or Over) or Well Points; Rock, Stone Breaker; Screed (Milling Machine); Stump Chipper; Tank Car Heaters; Vibratory Hammer or Extractor, Power Pack.	29.82	17.98	47.80
546	Fiber Optic Cable Equipment.	25.74	15.85	41.59
547	Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.	37.45	19.45	56.90
548	Work Performed on the Great Lakes Including 70 Ton & Over Tug Operator; Assistant Hydraulic Dredge Engineer; Crane or Backhoe Operator; Hydraulic Dredge Leverman or Diver's Tender; Mechanic or Welder.	37.45	19.45	56.90
549	Work Performed on the Great Lakes Including Deck Equipment Operator or Machineryman (Maintains Cranes Over 50 Tons or Backhoes 115,000 Lbs. or more); Tug, Launch or Loader, Dozer or Like Equipment When Operated on a Barge, Breakwater Wall, Slip, Dock or Scow, Deck Machinery.	27.75	19.15	46.90
550	Work Performed on the Great Lakes Including Deck Equipment Operator; Machineryman or Fireman (Operates 4 Units or More or Maintains Cranes 50 Tons or Under or Backhoes 115,000 Lbs. or Under); Deck Hand, Deck Engineer or Assistant Tug Operator; Off Road Trucks - Great Lakes ONLY.	27.75	19.15	46.90

**HEAVY EQUIPMENT OPERATORS
ASPHALT PAVEMENT OR OTHER WORK**

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
551	Crane, Tower Crane, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons, Self Erecting Tower Crane With a Lifting Capacity of Over 4,000 Lbs., Crane With Boom Dollies; Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads and/or Jib Lengths Measuring 176 Ft or Over; Master Mechanic.	34.62	17.98	52.60
552	Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of 130,000 Lbs. or Over; Caisson Rig; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under, Self-Erecting Tower Crane With a Lifting Capacity Of 4,000 Lbs. & Under; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 175 Ft or Under; Dredge (NOT Performing Work on the Great Lakes); Licensed Boat Pilot (NOT Performing Work on the Great Lakes); Pile Driver. Future Increase(s): Add \$1/hr on 6/2/2013.	32.92	18.46	51.38

Fringe Benefits Must Be Paid On All Hours Worked

<u>CODE</u>	<u>TRADE OR OCCUPATION</u>	<u>HOURLY BASIC RATE OF PAY</u> \$	<u>HOURLY FRINGE BENEFITS</u> \$	<u>TOTAL</u> \$
553	Air, Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Asphalt Heater, Planer & Scarifier; Asphalt Milling Machine; Asphalt Screed; Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Bituminous (Asphalt) Plant & Paver, Screed; Boring Machine (Directional, Horizontal or Vertical); Bulldozer or Endloader; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Concrete Conveyor System; Concrete Laser/Screed; Concrete Slipform Placer Curb & Gutter Machine; Crane (Carry Deck, Mini) or Truck Mounted Hydraulic Crane (10 Tons or Under); Crane With a Lifting Capacity of 25 Tons or Under; Forestry Equipment, Timbco, Tree Shear, Tub Grinder, Processor; Gradall (Cruz-Aire Type); Grader or Motor Patrol; Hydro-Blaster (10,000 PSI or Over); Loading Machine (Conveyor); Manhoist; Material or Stack Hoist; Mechanic or Welder; Milling Machine; Post Hole Digger or Driver; Railroad Track Rail Leveling Machine, Tie Placer, Extractor, Tamper, Stone Leveler or Rehabilitation Equipment; Roller (Over 5 Ton); Scraper (Self Propelled or Tractor Drawn) 5 cu yds or More Capacity; Shoulder Widener; Sideboom; Skid Rig; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); Tractor (Scraper, Dozer, Pusher, Loader); Tractor or Truck Mounted Hydraulic Backhoe; Trencher (Wheel Type or Chain Type); Tube Finisher; Tugger (NOT Performing Work on the Great Lakes); Winches & A-Frames. Future Increase(s): Add \$1/hr on 6/2/2013.	32.39	18.46	50.85
554	Backfiller; Broom or Sweeper; Compactor (Self-Propelled or Tractor Mounted, Towed & Light Equipment); Concrete Finishing Machine (Road Type); Environmental Burner; Farm or Industrial Type Tractor; Fireman (Asphalt Plant, Pile Driver & Derrick NOT Performing Work on the Great Lakes); Forklift; Greaser; Hoist (Tugger, Automatic); Jeep Digger; Joint Sawyer (Multiple Blade); Launch (NOT Performing Work on the Great Lakes); Lift Slab Machine; Mechanical Float; Mulcher; Power Subgrader; Robotic Tool Carrier (With or Without Attachments); Roller (Rubber Tire, 5 Ton or Under); Self-Propelled Chip Spreader; Shouldering Machine; Skid Steer Loader (With or Without Attachments); Telehandler. Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14.	33.67	19.55	53.22
555	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Augers (Vertical & Horizontal); Automatic Belt Conveyor & Surge Bin; Boiler (Temporary Heat); Crusher, Screening or Wash Plant; Generator (&/or 150 KW or Over); Heaters (Mechanical); High Pressure Utility Locating Machine (Daylighting Machine); Mudjack; Oiler; Prestress Machine; Pug Mill; Pump (3 Inch or Over) or Well Points; Rock, Stone Breaker; Screed (Milling Machine); Stump Chipper; Tank Car Heaters; Vibratory Hammer or Extractor, Power Pack. Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14.	33.67	19.55	53.22
556	Fiber Optic Cable Equipment.	25.74	15.85	41.59

***** END OF RATES *****

Consolidated List of Debarred Contractors
Prepared and Issued By
State of Wisconsin
Department of Workforce Development

September 1, 2012

This list has been prepared in accordance with the provisions of s. 66.0903(12), s. 66.0904(10) and s. 103.49(7), Stats. and Chapter DWD 294 of the Wisconsin Administrative Code. All contractors on this list were found to have committed a "debarable offense" related to certain labor standard provisions determined or established for a state or local public works project or publicly funded private construction project. No state agency, local governmental unit or owner or developer may knowingly solicit bids from, negotiate with or award any contracts to or approve or allow any subcontracts with a debarred contractor, including all divisions, affiliates or other organizational elements of such contractor that are engaged in construction business activities, until the debarment is terminated. The name of each debarred contractor must remain on this list for a period of three (3) years from the termination date indicated below. The contractor is, however, only "debarred" from the "effective date" through the "termination date" indicated for that contractor. Questions regarding this list should be addressed to Julie Eckenwalder, Equal Rights Division, P. O. Box 8928, Madison, WI 53708 or call (608) 266-3148. Deaf, hearing or speech-impaired callers may contact the department by calling its TDD number (608) 264-8752.

<u>Name of Contractor</u>	<u>Address</u>	<u>Effective Date</u>	<u>Termination Date</u>	<u>Cause Code</u>	<u>Date of Violation(s)</u>	<u>Limitations/Deviations</u>
Abel, Mike	See, Abel Electric, Inc					
Abel Electric, Inc	3385 Belmar Rd Green Bay, WI 54313	9/1/12	8/31/2015	1	2011	None
Atkins, Scott	See, Freedom Insulation, Inc					
Boecker, Roger	See, R-Way Pumping, Inc					
Castlerock Commercial Construction, Inc	PO Box 11699 Milwaukee, WI 53211-0699	2/1/12	1/31/15	1, 2 and 4	2009 & 2010	None
Custom Heating & Air LLC	283 Tony Lane Green Bay, WI 54304	12/1/06	11/30/09	1, 2 and 4	2003 & 2004	None
Dem/Ex Group, Inc	805 S Adams St Manito, IL 61546	12/1/11	11/30/14	1 and 2	2010	None
Fisher, Ed &/or Fisher, Rhonda	See, Dem/Ex Group, Inc					
Freedom Insulation, Inc	117925 219 th Ave Chippewa Falls, WI 54729	9/1/11	8/31/14	1	2008- 2010	None

<u>Name of Contractor</u>	<u>Address</u>	<u>Effective Date</u>	<u>Termination Date</u>	<u>Cause Code</u>	<u>Date of Violation(s)</u>	<u>Limitations/Deviations</u>
JT Roofing, Inc	350 Tower Dr Saukville, WI 53080	6/1/11	5/31/15	1, 2 and 4	2007 & 2008	None
Jinkins, Richard	See, Castlerock Commercial Construction, Inc.					
Joseph Stoller Company	N8426 Hwy 42 Algoma, WI 54201	2/1/07	1/31/10	1 and 2	2004 & 2005	None
Keiver, David	See, Custom Heating & Air LLC					
Ofstie, Darin	See, Precision Excavating and Grading, LLC					
Precision Excavating and Grading, LLC or Precision Excavating Enterprises, LLC	2104 Pierce Saint Croix Rd Baldwin, WI 54002	5/1/11	4/30/14	1, 2 and 4	2006- 2008	None
R-Way Pumping, Inc	3023 Lake Maria Rd Freeport, MN 56331	3/1/12	2/28/15	1, 2 and 4	2008	None
Stoller Enterprises LLC	N8426 Hwy 42 Algoma, WI 54201-9552	2/1/2007	1/31/10	1 and 2	2005 to 2006	None
Stoller, Joseph	See, Joseph Stoller Company					
Stoller, Patrick J	See, Stoller Enterprises LLC					
Thull, Gerald T	See, JT Roofing, Inc.					

Cause Code: 1 = Failure to Pay Straight Time 2 = Failure to Pay Overtime 3 = Kickback 4 = Payroll Records.

Disclosure of Ownership

The statutory authority for the use of this form is prescribed in Sections 66.0903(12)(d), 66.0904(10)(d) and 103.49(7)(d), Wisconsin Statutes.

The use of this form is mandatory. The penalty for failing to complete this form is prescribed in Section 103.005(12), Wisconsin Statutes.

Personal information you provide may be used for secondary purposes [Privacy Law, s. 15.04(1) (m), Wisconsin Statutes]

- (1) On the date a contractor submits a bid to or completes negotiations with a state agency, local governmental unit, or developer, investor or owner on a project subject to Section 66.0903, 66.0904 or 103.49, Wisconsin Statutes, the contractor shall disclose to such state agency, local governmental unit, or developer, investor or owner, the name of any "other construction business", which the contractor, or a shareholder, officer or partner of the contractor, owns or has owned within the preceding three (3) years.
- (2) The term "other construction business" means any business engaged in the erection, construction, remodeling, repairing, demolition, altering or painting and decorating of buildings, structures or facilities. It also means any business engaged in supplying mineral aggregate, or hauling excavated material or spoil as provided by Sections 66.0903(3), 66.0904(2), 103.49(2) and 103.50(2), Wisconsin Statutes.
- (3) This form must ONLY be filed, with the state agency project owner, local governmental unit project owner, or developer, investor or owner of a publicly funded private construction project that will be awarding the contract, if **both (A) and (B) are met.**
 - (A) The contractor, or a shareholder, officer or partner of the contractor:
 - (1) Owns at least a 25% interest in the "other construction business", indicated below, on the date the contractor submits a bid or completes negotiations.
 - (2) Or has owned at least a 25% interest in the "other construction business" at any time within the preceding three (3) years.
 - (B) The Wisconsin Department of Workforce Development (DWD) has determined that the "other construction business" has failed to pay the prevailing wage rate or time and one-half the required hourly basic rate of pay, for

Other Construction Business

Name of Business			
Street Address or P O Box	City	State	Zip Code
Name of Business			
Street Address or P O Box	City	State	Zip Code
Name of Business			
Street Address or P O Box	City	State	Zip Code
Name of Business			
Street Address or P O Box	City	State	Zip Code

I hereby state under penalty of perjury that the information, contained in this document, is true and accurate according to my knowledge and belief.

Print the Name of Authorized Officer			
Signature of Authorized Officer	Date Signed		
Name of Corporation, Partnership or Sole Proprietorship			
Street Address or P O Box	City	State	Zip Code

If you have any questions call (608) 266-6861

List of Agents and Subcontractors

Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number			Telephone Number		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number			Telephone Number		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number			Telephone Number		
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Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number			Telephone Number		
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Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number			Telephone Number		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number			Telephone Number		

Agent or Subcontractor Affidavit of Compliance With Prevailing Wage Rate Determination

Authorization for this form is provided under Sections 66.0903(9)(b), 66.0904(7)(b) and 103.49(4r)(9b), Wisconsin Statutes. The use of this form is mandatory. The penalty for failing to complete this form is prescribed in Section 103.005(12), Wisconsin Statutes.

Personal information you provide may be used for secondary purposes [Privacy Law, Section 15.04(1)(m), Wisconsin Statutes].

This form must **ONLY** be filed with the **Awarding Contractor** indicated below.

State Of _____))SS County Of _____)	Project Name	
	DWD Determination Number	Project Number (if applicable)
	Date Determination Issued	Date of Subcontract
	Awarding Contractor	
	Date Work Completed	

After being duly sworn, the person whose name and signature appears below hereby states under penalty of perjury that

- **I am** the duly authorized officer of the corporation, partnership, sole proprietorship or business indicated below. We have recently completed all of the work required under the terms and conditions of a subcontract with the above-named awarding contractor. We make this affidavit in accordance with the requirements set forth in Section 66.0903(9)(b), 66.0904(7)(b) or 103.49(4r)(b), Wisconsin Statutes and Chapter DWD 290 of the Wisconsin Administrative Code in order to obtain FINAL PAYMENT from such awarding contractor.
- **I have** fully complied with the entire wage and hour requirements applicable to this project, including all of the requirements set forth in the prevailing wage rate determination indicated above which was issued for such project by the Department of Workforce Development on the date indicated above.
- **I have** received the required affidavit of compliance from each of my agents and subcontractors that performed work on this project and have listed each of their names and addresses on page 2 of this affidavit.
- **I have** full and accurate records that clearly indicate the name and trade or occupation of every worker(s) that I employed on this project, including an accurate record of the hours worked and actual wages paid to such worker(s).
- **I will** retain the records and affidavit(s) described above and make them available for inspection for a period of at least three (3) years from the completion date indicated above at the address indicated below and shall not remove such records or affidavit(s) without prior notification to the awarding contractor.

Name of Corporation, Partnership, Sole Proprietorship, Business, State Agency or Local Governmental Unit				
Street Address or PO Box	City	State	Zip Code	Telephone Number ()
Print Name of Authorized Officer			Date Signed	
Authorized Officer Signature				

List of Agents and Subcontractors

Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number ()			Telephone Number ()		
Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number ()			Telephone Number ()		
Name			Name		
Street Address			Street Address		
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Name			Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code
Telephone Number ()			Telephone Number ()		

If you have any questions call (608) 266-6861

Request to Employ Subjourneyperson

The use of this form is mandatory. The penalty for failing to complete this form is prescribed in Section 103.005(12), Wisconsin Statutes. Personal information you provide may be used for secondary purposes (Privacy Law, s. 15.04(1)(m), Wisconsin Statutes).

The employer indicated below requests that the Department of Workforce Development (DWD) determine the prevailing wage rate(s) and related qualifications to enable such employer to use a subjourneyperson(s) on the following prevailing wage project, in accordance with the provisions of Section DWD 290.025, Wisconsin Administrative Code.

1. Name of Project Appearing on the Project Determination		
County	City, Village or Town	
DWD Project Determination Number	Project Number (if applicable)	
2. Job Classification(s) for which you request a subjourney rate (i.e., carpenter, electrician, plumber, etc.)		
a.	b.	
c.	d.	
3. Employer Name (Print)		
Address	City	State
Telephone Number ()	Requester Title	
Email address (if you prefer to receive your response via email)	Fax Number (if you prefer to receive your response via fax) ()	

READ CAREFULLY: I understand that this request is ONLY applicable to the project and job classification(s) listed above and that subjourney employees primarily work under the direction of and assist a skilled trade employee by frequently using the tools of a skilled trade and will NOT regularly perform the duties of a general laborer, heavy equipment operator or truck driver. If the subjourney employee regularly performs the work of a different trade or occupation, he/she will be compensated for such work at the applicable journeyperson prevailing wage rate. I agree to compensate subjourney employees in strict accordance with the directions received from the DWD.

Requester Signature	Date Signed
---------------------	-------------

MAIL the completed request to:
 EQUAL RIGHTS DIVISION, LABOR STANDARDS BUREAU
 PO BOX 8928, MADISON WI 53708
 OR
 FAX the completed request to: (608) 267-0310 / **DO NOT e-mail your request.**
 Call (608) 266-6861 for assistance in completing this form.

Department of Workforce Development
Equal Rights Division
P.O. Box 8928
Madison, WI 53708-8928
Telephone: (608) 266-6860
Fax: (608) 267-4592
TTY: (608) 264-8752



Scott Walker, Governor
Reginald J. Newson, Secretary
John P. Conway, Division Administrator

PREVAILING WAGE – Public Entity Project Owners

Any public works project that has a total estimated project cost that equals or exceeds single-trade or multiple-trade project thresholds requires a prevailing wage rate determination issued by the Department of Workforce Development (DWD). Public works include erecting, constructing, remodeling, repairing, demolishing, alterations, painting and decorating projects for a local governmental unit or state agency. State law excludes minor service or maintenance work, warranty work, or work under a supply-and-installation contract. There is a statutory definition for each of these exclusions. The prevailing wage law that applies to local governmental units is §66.0903, Wis. Stats. The prevailing wage law that applies to state agencies is §103.49, Wis. Stats. The applicable administrative rules for all public entities are DWD 290 and DWD 294, Wis. Adm. Code.

Thresholds

A "single-trade project of public works" means a project in which a single trade accounts for 85% or more of the total labor cost of the project. The single trade threshold is \$48,000.

A "multiple-trade project of public works" means a project in which no single trade accounts for 85% or more of the total labor cost of the project.

(a) The multiple-trade threshold is \$100,000, unless a municipality falls under the description in (b).

(b) The multiple-trade threshold of \$234,000 applies to public works projects erected, constructed, repaired, remodeled, or demolished by a private contractor for •a city or village with a population less than 2500 or •a town.

Effective July 1, 2011, a local governmental unit or state agency that has a public works project that equals or exceeds the prevailing wage thresholds must do all of the following:

- Request a prevailing wage rate determination for the project from DWD at least 30 days before soliciting bids or negotiating contracts. An Application for Prevailing Wage Rate Determination is available on the DWD website: http://dwd.wisconsin.gov/er/prevailing_wage_rate/default.htm

To avoid waiting for a project determination use the on-line application system that permits the user to generate a determination immediately and save all documents in PDF form to the user's computer. Use this project determination on line application at the following address:

http://dwd.wisconsin.gov/er/prevaling_wage_rate/pw_online_determinations.htm

- Tell potential contractors the project is subject to state prevailing wage law when soliciting bids.
- Include the prevailing wage rate determination in the construction contract, or if there is no written contract, provide a copy of the project determination to each prime contractor.
- Award contracts to contractors who do *not* appear on the “Consolidated List of Debarred Contractors.”
- Post the prevailing wage rate determination on the project site. (This document is often referred to as “the white sheet.”)
- Notify project contractors that if DWD finds that a contractor violated the prevailing wage law, DWD will assess liquidated damages of 100% of the wages owed to employees.
- Obtain an Affidavit of Compliance from each prime contractor before making final payment for the project.

If the total estimated cost of the project exceeds the prevailing wage thresholds, a local governmental unit or state agency also must obtain a prevailing wage rate determination under the following circumstances:

- when a completed facility is leased, purchased, lease-purchased or otherwise acquired by or dedicated to a public entity in lieu of the public entity contracting for the project,
- when one public entity does work for another public entity,
- when a *private* entity will construct a road, street, bridge, sanitary sewer or water main project and dedicate it to a local governmental unit or the state for its ownership or maintenance (except for some residential subdivisions).

For more information, visit the prevailing wage website: http://dwd.wisconsin.gov/er/prevaling_wage_rate/default.htm. For further assistance, call the Equal Rights Division at 608-266-6861 and ask for prevailing wage.

Department of Workforce Development
Equal Rights Division
P.O. Box 8928
Madison, WI 53708-8928
Telephone: (608) 266-6860
Fax: (608) 267-4592
TTY: (608) 264-8752



Scott Walker, Governor
Reginald J. Newson, Secretary
John P. Conway, Division Administrator

PREVAILING WAGE – Contractors

Any public works project that has a total estimated project cost that equals or exceeds prevailing wage project thresholds requires a prevailing wage rate determination issued by the Department of Workforce Development (DWD). Public works include erecting, constructing, remodeling, repairing, demolishing, alterations, painting and decorating projects for a local governmental unit or state agency. State law excludes minor service or maintenance work, warranty work, or work under a supply-and-installation contract. There is a statutory definition for each of these exclusions. The prevailing wage law that applies to local governmental units and their contractors is §66.0903, Wis. Stats. The prevailing wage law that applies to state agencies and their contractors is §103.49, Wis. Stats. The applicable administrative rules for all prevailing wage projects are DWD 290 and DWD 294, Wis. Adm. Code. These laws include provisions that apply to all contractors and subcontractors working on prevailing wage projects.

Effective July 1, 2011, any contractor or subcontractor working on a local governmental unit or state agency's public works project that equals or exceeds current prevailing wage project thresholds must do all of the following:

- Receive and review the project's prevailing wage rate determination (i.e., white sheet).
- Tell subcontractors the project is subject to state prevailing wage law and include the prevailing wage rate determination in the construction contract, or if there is no written contract, provide a copy of the project determination to each subcontractor.
- Hire subcontractors who do *not* appear on the "Consolidated List of Debarred Contractors."
- Notify subcontractors that if DWD finds that a contractor or subcontractor violated the prevailing wage law, DWD will assess liquidated damages of 100% of the wages owed to employees.

- Apply to DWD for subjourney wage rates prior to employing these individuals on the project.
- Receive and retain a completed Affidavit of Compliance from each subcontractor brought on to the project before providing final payment to those subcontractors.
- Submit a completed Affidavit of Compliance to the contractor who brought the subcontractor on to the project before receiving final payment for the project.
- Maintain payroll records for 3 years that comply with §§66.0903(10)(a) or 103.49(5)(a), Stats. and DWD 274.06.
- Respond to requests from DWD or the project owner to provide payroll records and/or respond to prevailing wage complaints filed by employees or third parties.

For more information, visit the prevailing wage website: http://dwd.wisconsin.gov/er/prevailing_wage_rate/default.htm. For further assistance, call the Equal Rights Division at 608-266-6861 and ask for prevailing wage.

SUMMARY OF PREVAILING WAGE LAW CHANGES EFFECTIVE JULY 1, 2011

(This document updated 07/27/11)

For further updates on this topic, refer to the prevailing wage website at:
http://dwd.wisconsin.gov/er/prevailing_wage_rate/default.htm

The recently approved State budget bill (2011 Wisconsin Act 40) includes major changes to prevailing wage laws (§§66.0903, 66.0904, 103.49 & 103.50, Wis. Stats.) effective JULY 1, 2011. Significant changes are described below.

Topic	Who's affected?	Brief description of requirement under §66.0903 or §103.49
Thresholds	All public entities & Contractors	The \$25,000 threshold for public works projects has been changed to single-trade and multiple-trade project thresholds as noted below. The new thresholds apply to prevailing wage projects whose prime contract is awarded after June 30, 2011.
Non-applicability: Threshold for Single-Trade Projects	All public entities & Contractors	Any single-trade project of public works with an estimated cost of completion of less than \$48,000 does not require a prevailing wage rate determination. "Single-trade project of public works" means a project of public works in which a single trade accounts for 85 percent or more of the total labor cost of the project.
Non-applicability: Threshold for Multiple-Trade Projects	All public entities except cities, towns & villages as noted below & Contractors	Any multiple-trade project of public works with an estimated cost of completion of less than \$100,000 does not require a prevailing wage rate determination. "Multiple-trade project of public works" means a project of public works in which no single trade accounts for 85 percent or more of the total labor cost of the project.
Non-applicability: Threshold for Multiple-Trade Projects	Cities or villages with a population less than 2500 & Towns & Contractors	A multiple trade project of public works erected, constructed, repaired, remodeled, or demolished by a private contractor for a city or village with a population less than 2500, or a town with an estimated cost of completion of less than \$234,000 does not require a prevailing wage rate determination. "Multiple-trade project of public works" means a project of public works in which no single trade accounts for 85 percent or more of the total labor cost of the project.
Non-applicability: Minor service & maintenance work	Towns & Contractors	The following TOWN projects only do not require a prevailing wage rate determination: <ul style="list-style-type: none"> • A project not funded under §86.31, Stats. (TRIP projects) that is limited to minor crack filling, chip or slurry sealing or other minor pavement patching, not including overlays. • The depositing of gravel on an existing gravel road applied solely to maintain the road; • Road shoulder maintenance; • Cleaning drainage or sewer ditches or structures; • Any other limited, minor work on public facilities or equipment that is routinely performed to prevent breakdown or deterioration.
Non-applicability: Work which a contractor or individual donates to a public entity	All public entities	Prevailing wage laws §§66.0903 & 103.49, Stats., do not apply to work performed on a project of public works for which the local governmental unit or the state or the state agency contracting for the project is not required to compensate any contractor, subcontractor, contractor's or subcontractor's agent, or individual for performing the work.

Topic	Who's affected?	Brief description of requirement under §66.0903 or §103.49
Non-applicability: Residential	All public entities	A prevailing wage rate determination is not required for the erection, construction, repair, remodeling, or demolition of a residential property containing 2 dwelling units or less.
Non-applicability: Residential subdivision infrastructure	All public entities	A prevailing wage rate determination is not required for a road, street, bridge, sanitary sewer, or water main project that is a part of a development in which at least 90 percent of the lots contain or will contain 2 dwelling units or less, as determined by the local governmental unit at the time of approval of the development, and that, on completion, is acquired by, or dedicated to, a local governmental unit (including under §236.13(2), Stats.), or the state, for ownership or maintenance by the local governmental unit or the state.
Non-applicability: Certain nursing homes	All public entities	Prevailing wage law §66.0903, Stats., does not apply to a project of public works involving the erection, construction, repair, remodeling, or demolition of a nursing home in a county having a population of less than 50,000 when the project commences no later than July 1, 2012.
Electronic certified payroll record	Contractors	The requirement that every contractor on a prevailing wage project submit to DWD monthly a certified record of employees who worked on the project and that DWD post these certified records on its Internet website is discontinued effective July 1, 2011. However, contractors who worked on prevailing wage projects during the period January 1, 2010 through June 30, 2011, must comply with the repealed law for work completed on projects during that period of time.
Payroll record inspection request by any person	Contractors & Complainants	Any person may request DWD to inspect the payroll records of any contractor working on a prevailing wage project. On receipt of such a request, the contractor must submit to DWD a certified record of its payroll records, other than personally identifiable information relating to an employee of the contractor, for no longer than a 4-week period. DWD may request records from a contractor under this provision no more than once per calendar quarter for each project of public works on which the contractor is performing work. The department may not charge a requester a fee for obtaining that information. DWD must make these certified records available for public inspection.
Complaints	Complainants	There are no longer investigation fees.
Statewide uniformity	Local governmental units	A local governmental unit may not enact & administer a prevailing wage ordinance/provision for public works or publicly funded private construction projects. Any extant laws to that effect are void.

Topic	Who's affected?	Brief description of requirement under §66.0903, §103.49 or §103.50
Covered employees	Truck drivers & Other workers & Contractors	<p>A laborer, worker, mechanic, or truck driver who is employed to process, manufacture, pick up, or deliver materials or products from a commercial establishment that has a fixed place of business from which the establishment supplies processed or manufactured materials or products or from a facility that is not dedicated exclusively, or nearly so, to a project of public works is NOT entitled to receive the prevailing wage rate UNLESS any of the following applies:</p> <p>1) the laborer, worker, mechanic, or truck driver is employed to go to the source of mineral aggregate such as sand, gravel, or stone and deliver that mineral aggregate to the site of a project of public works by depositing the material directly in final place, from the transporting vehicle or through spreaders from the transporting vehicle.</p> <p>2) the laborer, worker, mechanic, or truck driver is employed to go to the site of a project of public works, pick up excavated material or spoil from the site of the project, and transport that excavated material or spoil away from the site of the project.</p>
Annual Prevailing Wage Survey	All public entities	When establishing yearly prevailing wage rates, DWD may not use data from any construction work that is performed by a local governmental unit or a state agency.
Prevailing Wage Rates	DOT & Contractors & Employees	For state highway prevailing wage rates, DWD is required to include wage rates for work performed on Sundays, holidays and shift differentials based on the time of day or night when work is performed.

The 2009-2011 State budget bill (2009 Wisconsin Act 28) created a new prevailing wage law (§66.0904, Wis. Stats.) for PUBLICLY FUNDED PRIVATE CONSTRUCTION PROJECTS effective January 1, 2010. The current 2011-2013 State budget bill (2011 Wisconsin Act 32) REPEALS this law. So the publicly funded private construction projects law only applies to projects that awarded the prime contract during the period January 1, 2010 through June 30, 2011.

**SINGLE & MULTIPLE TRADE PROJECT THRESHOLDS
FOR §§66.0903 & 103.49, Wis. Stats.
Effective July 1, 2011**

The \$25,000 threshold for public works projects has been changed to single-trade and multiple-trade project thresholds as described below. Projects of public works with total estimated costs of completion that equal or exceed these thresholds require a prevailing wage rate determination.

SINGLE-TRADE THRESHOLD

A “single-trade project of public works” means a project in which a single trade accounts for 85 percent or more of the total labor cost of the project.

The single trade threshold is \$48,000.

MULTIPLE-TRADE THRESHOLDS

A “multiple-trade project of public works” means a project in which no single trade accounts for 85 percent or more of the total labor cost of the project.

(a) The multiple-trade threshold is \$100,000, unless a municipality falls under the description in (b).

(b) The multiple-trade threshold of \$234,000 applies to public works projects erected, constructed, repaired, remodeled, or demolished by a private contractor for:

- a city or village with a population less than 2500, or
- a town

APPLYING THE NEW THRESHOLDS

The department will apply the new single-trade & multiple-trade prevailing wage thresholds to projects of public works for which the prime contract is awarded on or after July 1, 2011.

SECTION 01 00 00
BASIC REQUIREMENTS

PART 1 GENERAL

1.1 SECTION SUMMARY

- A. Section Includes:
1. Section Summary
 2. Summary of the Work
 3. Contractor Use of Premises
 4. Applications for Payment
 5. Alternates, Unit Prices, Informational Bids and Allowance
 6. Coordination
 7. Cutting and Patching
 8. Conferences
 9. Progress Meetings
 10. Submittal Procedures
 11. Proposed Products List
 12. Shop Drawings
 13. Product Data
 14. Samples
 15. Manufacturers' Instructions
 16. Manufacturers' Certificates
 17. Quality Assurance / Quality Control of Installation
 18. References
 19. Erection Drawings
 20. Protection of Installed Work
 21. Parking
 22. Staging Areas
 23. Occupancy During Construction and Conduct of Work
 24. Protection
 25. Progress Cleaning
 26. Products
 27. Transportation, Handling, Storage and Protection
 28. Product Options
 29. Substitutions
 30. Starting Systems
 31. Demonstration and Instructions
 32. Contract Closeout Procedures
 33. Final Cleaning
 34. Adjusting
 35. Operation and Maintenance Data
 36. Spare Parts and Maintenance Materials
 37. Record Drawings and Specifications

1.2 SUMMARY OF THE WORK

- A. Project Description: Perform the Work as specified and detailed in Construction Documents package. Contractor to provide construction services for the new Alliant Energy Center Pavilions to include demolition of existing barn structures, site development (including utilities) and construction of two Pavilion buildings. Pavilion 1 will include a 2-story Pre-function conventional structure, while the remainder of the facility will feature pre-engineered metal frame construction. Pavilion 1 will be a heated structure intended for public events being held throughout the year. Pavilion 2 will feature pre-engineered metal frame construction and will not be a heated structure. There will be a shed roofed metal frame building on one end of Pavilion 2 that will serve as a maintenance facility and there is a design for an adjacent shed roofed metal frame storage building also located on the west end (the storage building is listed as an alternate and may be constructed during this project or at another time in the future).

A substantial part of the Work involves construction services for Site Development around the Pavilions and Stormwater Improvements around the periphery of the building site. The Stormwater Improvements will include dredging and restoration of an existing dry basin in the northwest corner of the site, construction of a small detention basin north of the site, and restoration of the disturbed area and related site work. Quantities include approximately 2,000 cubic yards of excavation, construction of a small gabion weir, and restoration of approximately 68,000 square feet of disturbed area.

The entire project from demolition to substantial completion must occur between April 14, 2014 and September 19, 2014 to allow the Midwest Horse Fair and the World Dairy Expo to hold and prepare for their respective events.. The substantial completion will be required to allow the public to use the Pavilion structures during the World Dairy Expo (See Bid Form). Final completion of the project is slated for September 19, 2014. The limited construction schedule that is available to achieve the above stated deadlines will require keeping to a tight schedule throughout the project construction phase.

- B. Permits: Prior to commencement of the Work, Contractor to secure any and all necessary permits for completion of the Work and facility occupancy. The County will obtain required demolition permits for the existing barn structures prior to the demolition work by the Contractor.

1.3 CONTRACTOR USE OF PREMISES

- A. Limit use of construction premises to allow work by Contractors or Subcontractors and access by County.
- B. During the project demolition and construction of the new buildings the Alliant Energy Center grounds will remain open to the public for events that will be held at the Exposition Hall, Coliseum, and Willow Island so coordination with the Alliant Energy Center designated Representative will be crucial to enable the public to have access, vehicle circulation, and necessary parking. The Contractor will have access to the site during all work hours via the west parking lot gate accessible from Olin Avenue, other gates will also be available dependent upon public event scheduling. There will be adequate Contractor dedicated spaces including employee & equipment parking, lay-off

areas, and staging areas available on the grounds to be coordinated with the Public Works Project Engineer and the Alliant Energy Center designated Representative.

- C. A schedule of Alliant Energy Center events that will be taking place during the construction period is provided below.

Goldwing Motorcycle show – 6/29-7/6/2014
Buckskin Horse Show – 7/11-7/13/2014
Dane County Fair – 7/15-7/20/2014
WI Barrel Horse Racing – 8/14-8/17/2014
Saddle bred Horse Show – 9/9-9/14/2014

1.4 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..
- 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 on Architect / Engineer approved form. Sequentially number transmittal forms. Mark revised submittals with original number and sequential alphabetic suffix. Identify project, Contractor, Subcontractor, and supplier.

1.5 ALTERNATES, UNIT PRICES, INFORMATIONAL BIDS & ALLOWANCE

- A. Alternates quoted on Bid Form shall be reviewed and accepted or rejected at the Owner's option. In addition to Alternates (Add/Deduct) provide Unit Prices and Informational Bids as listed on the Bid Form.
- B. Coordinate related work and modify surrounding work as required.
- C. Schedule of Alternates:

Alternate #1: Add price for providing interior build-out of Family Toilet 134, Janitor 135, Women's Toilet 136, and Men's Toilet 137. This alternate includes all above slab work including but not limited to; plumbing fixtures, CMU wall assemblies, light gage metal ceiling assemblies, interior finishes, specialties, mechanical and electrical equipment. Refer to the drawings for further clarifications.

Alternate #2: Add Alternate – Interior build-out option for Mezzanine level In Areas A & B (as indicated in the drawings).

Alternate #3: Add Alternate – Area F (as indicated in the drawings).

Alternate #4: Deduct Alternate – In concrete slabs-on-grade to provide fiber mesh reinforcing in lieu of wire mesh in slabs, unless noted otherwise.

Alternate #5: Deduct Alternate –Interior build-out for Area E (as indicated in the drawings). Floor slab and underfloor systems to be included in the scope of the work.

Alternate #6: Price for Siemens HVAC control system as described in Specification Section 23 09 23 Direct Digital Control (DDC) Systems in lieu of the specified manufacturer and system.

Alternate #7: Price for Honeywell HVAC control system as described in Specification Section 23 09 23 Direct Digital Control (DDC) Systems in lieu of the specified manufacturer and system.

D. Schedule of Unit Prices:

Unit Price 1: Removal And Replacement Of Unsuitable Foundation Material/UNIT PRICE.

- a. Price for removal of unsuitable foundation material and replacement with engineered fill material (refer to section 31 20 00 Earthmoving.)

E. Informational Bid items:

Informational Bid #1: Concession area grease interceptors

Informational Bid #2: Concession area grease hood make-up air system

1.6 COORDINATION

- A. Coordinate scheduling, submittals, and work of contained within the Construction Documents (including sections of Specifications) to assure efficient and orderly sequence of installation of interdependent construction elements. Provide an updated and current construction timetable at each project job progress meeting.
- B. Verify utility requirement characteristics of operating equipment are compatible with building utilities.
- C. Coordinate space requirements and installation of mechanical and electrical work that are indicated diagrammatically on Drawings.

1.7 CUTTING AND PATCHING

- A. Employ a skilled and experienced installer to perform cutting and patching new work.
- B. Submit written request to the Architect / Engineer in advance of cutting or altering structural or building enclosure elements.
- C. Fit work tight to adjacent elements. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

1.8 CONFERENCES

- A. Dane County Department Public Works, Highway & Transportation will schedule a preconstruction conference after Award of Contract for all affected parties.

- B. When required in individual Specification section, convene a pre-installation conference at project site prior to commencing work of the section. The Public Works Division will make available conference rooms when required for larger gatherings upon the request of the Contractor.

1.9 PROGRESS MEETINGS

- A. Architect/Engineer shall schedule and administer meetings throughout progress of the Work at minimum of one (1) per week.
- B. Architect/Engineer shall preside at meetings, record minutes, review the construction schedule, and distribute copies within two (2) days to those affected by decisions made.

1.10 SUBMITTAL PROCEDURES

- A. Contractor to provide a submittal form for submittals which will identify Project, Contractor, Subcontractor or supplier; and pertinent Construction Documents references. Allow space on the submittal for Contractor and Architect / Engineer stamps.
- B. Apply Contractor's stamp, signed or initialed, certifying that review, verification of Products required, field dimensions, adjacent construction work, and coordination of information is in accordance with requirements of the Work and Construction Documents. For each submittal review allow 10 days excluding delivery time to and from Contractor.
- C. Identify variations from Construction Documents and Product or system limitations that may be detrimental to successful performance of completing the Work.
- D. Revise and resubmit submittals as required; identify all changes made since previous submittal.

1.11 PROPOSED PRODUCTS LIST

- A. Within fifteen (15) days after date of Award of Contract, submit complete list of major Products proposed for use, with name of manufacturer, trade name, and model number of each Product.

1.12 SHOP DRAWINGS

- A. Submit number of copies that Contractor requires, plus four (4) copies that shall be retained by the Architect/Engineer and the Public Works Project Engineer. Submit to Architect / Engineer FTP site for review for limited purpose of checking for conformance with information given and design concept expressed in the Construction Documents.
- B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

- C. Submit one pdf copy on FTP site and four (4) hard copies total to Architect / Engineer and the Public Works Project Engineer. All shop drawings must be stamped by the Contractor, unless noted otherwise.
- D. After review, Contractor shall maintain copies required for Record Documents.

1.13 PRODUCT DATA

- A. Submit number of copies that Contractor requires, plus four (4) copies that shall be retained by the Architect/Engineer and the Public Works Project Engineer.
- B. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturer's standard data to provide information unique to this Project.

1.14 SAMPLES

- A. Submit samples to the Architect / Engineer to illustrate functional and aesthetic characteristics of the Product.
- B. Submit samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for Public Works Project Engineer's selection. Submit samples per the requirements of the Specification Sections, Architect / Engineer will retain one sample.

1.15 MANUFACTURERS' INSTRUCTIONS

- A. When specified in individual Specification sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, in quantities specified for Product Data.

1.16 MANUFACTURERS' CERTIFICATES

- A. When specified in individual Specification sections, submit manufacturers' certificate to Public Works Project Engineer for review, 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.
- D. Submit Test Reports for Architect / Engineer's review for County.
- E. Manufacturer's Field Reports, where available, shall be submitted to the Architect / Engineer for the limited purpose of assessing conformance with information given and design concept expressed in the Construction Documents.
- F. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions,

conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

- G. Submit qualifications of observer to Architect/Engineer 15 days in advance of required observations. Observer subject to approval of Architect / Engineer and County.
- H. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

1.17 QUALITY ASSURANCE / QUALITY 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 Construction 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 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.

1.18 REFERENCES

- A. Conform to reference standard by date of issue current as of date for receiving bids.
- B. Should specified reference standard conflict with Construction Documents, request clarification from Public Works Project Engineer before proceeding.

1.19 ERECTION DRAWINGS

- A. Submit Drawings for Architect / Engineer's benefit as representative for the County. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Construction Documents.
- B. Data indicating inappropriate or unacceptable Work may be subject to action by the Architect / Engineer and the County.

1.20 PROTECTION OF INSTALLED WORK

- A. Protect installed work and provide special protection where specified in individual Specification sections.

1.21 PARKING

- A. Temporary parking areas to accommodate construction personnel will be available at the Work site. Location of such parking for construction personnel and construction equipment shall be coordinated with both the Public Works Project Engineer and the designated Alliant Energy Center Representative. The Contractor will have access to the site during all work hours via the west parking lot gate accessible from Olin Avenue, other gates will also be available dependent upon public event scheduling. There will be adequate Contractor dedicated spaces including employee & equipment parking will be coordinated with the Public Works Project Engineer and the Alliant Energy Center designated Representative.

1.22 STAGING AREAS

- A. On-site space for use as staging areas and storage of materials is available and will be apportioned among the various Contractors as their needs dictate with due regard for storage requirements of each Contractor. Each Contractor shall be responsible for safety of equipment and materials that are stored on site. Location of the staging areas and the areas for storage of materials shall be coordinated with the both the Public Works Project Engineer and the designated Alliant Energy Center Representative prior to starting the Work.
- B. Alternatives for the location of Contractor Field Offices will be discussed at the first opportunity. Provision of utility of connections will be discussed with the Alliant Energy Center to develop efficient locations for the Contractor access to utilities on the site..

1.23 OCCUPANCY DURING CONSTRUCTION AND CONDUCT OF WORK

- A. Areas of existing facility will be occupied during period when the Work is in progress. Work may be done during normal business hours (7:30am to 7:00 pm), but confer with County, schedule work and store materials so as to interfere as little as possible with normal use of premises (specifically related to events at the Exposition Hall & Coliseum).. Notify County when noise making work is to be done and obtain Counties's written approval of schedule. If schedule is not convenient for County, reschedule and resubmit new times for Owner approval.
- B. Work shall be done and temporary facilities furnished so as not to interfere with access to any adjacent buildings and so as to cause least possible interference with normal operation of the fairgrounds or any essential service thereof.
- C. Contractor shall, at all times, provide approved, safe walkways and facility access for use by the County, Architect / Engineer, and employees.

- D. Contractor shall provide adequate protection for all parts of facility, its contents and occupants wherever the Work under this contract is to be performed.
- E. Each Contractor shall arrange with County to make necessary alterations, do new work, make connections to all utilities, etc., at such times as will not cause interruption of utility services to adjacent facilities. Contractor doing this work shall protect, cap, cut off and / or replace and relocate existing pipes, electrical work and other active utilities encountered which may interfere with new construction work.
- F. New work in extension of existing work shall correspond in all respects with that to which it connects or similar existing work unless otherwise indicated or specified.
 - 1. Existing work shall be cut, altered, removed or replaced as necessary for performance of contract obligations.
 - 2. Work remaining in place, damaged or defaced by reason of work done under this contract shall be restored equal to its condition at time of Award of Contract.

1.24 PROTECTION

- A. Contractor shall protect from injury all trees, light poles, walks and driveways and pay for any damage to same resulting from insufficient or improper protection.
- B. Guard Light: Contractor shall provide and maintain guard lights at all barricades, railings, obstructions in streets, roads or sidewalks and at all trenches adjacent to publicly used walks or roads.

1.25 PROGRESS CLEANING

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

1.26 PRODUCTS

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work, but does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components specifically identified for reuse.
- B. Do not use materials and equipment removed from existing premises, except as specifically identified or allowed by Construction Documents.

1.27 TRANSPORTATION, HANDLING, STORAGE AND PROTECTION

- A. Transport, handle, store and protect Products in accordance with manufacturer's instructions.

1.28 PRODUCT OPTIONS

- A. Where definite material is specified, it is not intention to discriminate against "equal" product made by another manufacturer. Intention is to set definite standard of material quality.
- B. Products and materials that are not specified, but have been approved for use by Public Works Project Engineer shall be identified in addenda to all bidding contractors.
- C. Requests for material or product substitutions submitted shall be considered after the Bid Date. Dane County reserves right to approve or reject substitutions based on Specification requirements and intended use.

1.29 SUBSTITUTIONS

- A. Public Works Project Engineer shall consider requests for Substitutions only within fifteen (15) days after date of Public Works Contract or as determined during the pre-construction meeting. Substitutions shall be submitted to the Architect / Engineer for initial review.
- B. Document each request with complete data substantiating compliance of proposed Substitution with Construction Documents.
- C. Submit three (3) copies of requests for Substitution for consideration. Limit each request to one (1) proposed Substitution.
- D. Substitutions shall not change contract price established at Due Date.

1.30 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect / Engineer, County 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 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 {01330 - Submittal Procedures} that equipment or system has been properly installed and is functioning correctly.

1.31 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to County's personnel two weeks prior to date of Substantial Completion.
- B. Demonstrate Project equipment
- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with County's personnel in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. Required instruction time for each item of equipment and system is specified in individual sections.

1.32 CONTRACT CLOSEOUT PROCEDURES

- A. Submit written certification that Construction Documents have been reviewed, the Work has been inspected, and the Work is complete in accordance with Construction Documents and ready for Public Works Project Engineer's inspection.
- B. Submit final Application for Payment identifying total adjusted Contract Sum / Price, previous payments, and amount remaining due.

1.33 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. Clean filters of operating equipment.

- E. Clean debris from roofs, gutters, downspouts, and drainage systems.
- F. Clean site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.34 ADJUSTING

- A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.35 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. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- D. 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. 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 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. Originals of warranties and bonds.

1.36 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide Products, spare parts, maintenance and extra materials in quantities specified in individual Specification Sections.
- B. Deliver to the Work site and place in location as directed.

1.37 RECORD DRAWINGS AND SPECIFICATIONS

- A. Contractor-produced Drawings and Specifications shall remain property of Contractor whether Project for which they are made is executed or not. At completion of the project, General Contractor will submit marked-up as-built prints to the A/E who shall, based on these marked-up as-built prints, revise the original documents, including the electronic files, showing changes in the work made during the construction process to produce a set of Record Documents.

PART 1 PRODUCTS - Not Used

PART 2 EXECUTION - Not Used

END OF SECTION

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SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Tolerances.
- B. References.
- C. Labeling.
- D. Mock-up requirements.
- E. Testing and inspection services.
- F. Examination.
- G. Preparation.

1.2 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 Construction Documents, request clarification from Architect/Engineer before proceeding.
- C. Adjust products to appropriate dimensions; position before securing products in place.

1.3 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 Construction 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 Construction 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 Construction Documents by mention or inference otherwise in reference documents.

1.4 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.

1.5 MOCK-UP REQUIREMENTS

- A. Tests will be performed under provisions identified in this section and identified in respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Accepted mock-ups shall be comparison standard for remaining Work.
- D. Where mock-up has been accepted by Architect/Engineer and the County and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so by Architect/Engineer or the Public Works Project Engineer..

1.6 TESTING AND INSPECTION SERVICES

- A. Owner will employ and pay for specified services of an independent firm to perform testing and inspection if additional testing and inspection services are warranted during demolition and construction.
- B. Testing and employment of testing agency or laboratory shall not relieve Contractor of obligation to perform Work in accordance with requirements of Construction Documents.
- C. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by same independent firm on instructions by Architect/Engineer.
- D. Agency Responsibilities:
 - 1. Test samples of mixes submitted by Contractor.

2. Provide qualified personnel at site. Cooperate with Architect/Engineer and Contractor in performance of services.
3. Perform specified sampling and testing of products in accordance with specified standards.
4. Ascertain compliance of materials and mixes with requirements of Construction Documents.
5. Promptly notify Architect/Engineer and Contractor of observed irregularities or non-conformance of Work or products.
6. Perform additional tests required by Architect/Engineer.
7. Attend preconstruction meetings and progress meetings.

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 SECTION 01 40 00

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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 heating
 - 4. Temporary cooling
 - 5. Temporary ventilation
 - 6. Telephone service
 - 7. Facsimile service
 - 8. Temporary water service
 - 9. Temporary sanitary facilities

- B. Construction Facilities:
 - 1. Field offices and sheds
 - 2. Vehicular access
 - 3. Parking
 - 4. Progress cleaning and waste removal
 - 5. Project identification
 - 6. Traffic regulation
 - 7. Fire prevention facilities

- C. Temporary Controls:
 - 1. Barriers
 - 2. Enclosures and fencing
 - 3. Security
 - 4. Water control
 - 5. Dust control
 - 6. Erosion and sediment control
 - 7. Noise control
 - 8. Pollution control

- D. Removal of utilities, facilities, and controls

1.2 TEMPORARY ELECTRICITY

- A. Provide and pay for power service required from Madison Gas & Electric (MG&E) source as needed for construction operation. Utilize Owner's existing power service, but provide separate metering and reimburse County for cost of energy used.
- B. Provide temporary electric feeder from electrical service at location as directed by County. Do not disrupt County'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 as required for construction operations in consultation with Alliant Energy Center designated Representative. . Provide flexible power cords as required for portable construction tools and equipment.
- E. Provide feeder switch at source distribution equipment. Provide separate Meter.
- F. Permanent convenience receptacles may not be utilized during construction without prior authorization by the County.
- G. Provide distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting as required for construction operations and site lighting around construction area.

1.3 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain lighting for construction operations to achieve minimum lighting level of 2 watt/square foot.
- B. Provide and maintain 1 watt/square foot lighting to exterior staging and storage areas after dark for security purposes.
- C. Provide and maintain 0.25 watt/square foot HID lighting to interior work areas after dark for security purposes.
- D. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps for specified lighting levels.
- E. Maintain lighting and provide routine repairs.
- F. Permanent building lighting may not be utilized during construction.

1.4 TEMPORARY HEATING

- A. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations. Provide separate metering and reimburse County for cost of energy used.

- B. Prior to operation of permanent equipment for temporary heating purposes, verify installation is approved for operation and will not void warranty by the use, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts. Coordinate with Architect / Engineer and County prior to use of permanent equipment.

1.5 TEMPORARY COOLING

- A. Provide and pay for cooling devices and cooling as needed to maintain specified conditions for construction operations. Provide separate metering and reimburse County for cost of energy used.
- B. Prior to operation of permanent equipment for temporary cooling purposes, verify installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

1.6 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.

1.7 TELEPHONE SERVICE

- A. Provide, maintain, and pay for telephone service to field office and Architect/Engineer's field office at time of project mobilization.

1.8 FACSIMILE SERVICE

- A. Provide, maintain and pay for facsimile service and dedicated telephone line to field office and Architect/Engineer's field office at time of project mobilization.

1.9 TEMPORARY WATER SERVICE

- A. County will pay cost of temporary water. Exercise measures to conserve energy. Utilize County'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.

1.10 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Existing facility use is not permitted with the exception of the existing restroom/shower facility in the barn area that is slated for demolition which can be utilized until demolished. Provide facilities at time of project mobilization.

1.11 FIELD OFFICES AND SHEDS

- A. Do not use existing facilities for field offices or for storage.
- B. Contractor and sub-contractors (where necessary) to provide Weather tight, with lighting, electrical outlets, and heat as needed for their own use during project.
- C. Provide space for Project meetings, with table and chairs to accommodate 6 persons. Larger project meetings can be accommodated at the Public Works Division offices on the Alliant Energy Center site.
- D. Office for the Architect / Engineer will be provided by the County.
- E. Locate offices and sheds where determined by County at pre-construction meeting.
- F. When permanent facilities are enclosed with operable utilities, Contractor may elect to relocate offices and storage into building, with written agreement of County, and remove temporary buildings.
- G. Construction: Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations with steps and landings at entrance doors.
 - 1. Construction: Structurally sound, secure, weather tight enclosures for office and storage spaces. Maintain during progress of Work; remove when no longer needed
 - 2. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy and storage requirements.
 - 3. Locate a minimum distance away of 30 feet from new structure.
 - 4. Lighting for exterior lighting at entrance doors.
 - 5. Interior Materials in Storage Sheds: As required to provide specified conditions for storage of products.
- H. Environmental Control:
 - 1. Storage Spaces: Heating and ventilation as needed to maintain products in accordance with Construction Documents; lighting for maintenance and inspection of products.
- I. Storage Areas And Sheds: Size to storage requirements for products of individual Sections, allowing for access and orderly provision for maintenance and for inspection of products by Architect / Engineer & Public Works Project Engineer.

- J. Preparation: Fill and grade sites for temporary structures sloped for drainage away from buildings.
- K. Installation:
 - 1. Install office spaces ready for occupancy within 15 days after date fixed in following Notice to Proceed.
 - 2. Parking: Hard surface lot parking will be available for the Contractor.
- L. Maintenance And Cleaning:
 - 1. Periodic cleaning and maintenance for office and storage areas.
 - 2. Maintain approach walks free of mud, water, and snow.
- M. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

1.12 VEHICULAR ACCESS

- A. Construct temporary access roads from public circulation roadways as necessary to serve construction area, of width and load bearing capacity to accommodate unimpeded traffic for construction purposes.
- B. Construct temporary culverts to span low areas and allow unimpeded drainage. Construct tracking pad where access roads meet public circulation roadways/areas & clean tracking pad periodically to keep mud off of them.
- C. Extend and relocate vehicular access as Work progress requires, provide detours as necessary for unimpeded traffic flow.
- D. Location as approved by the Public Works Project Engineer and Alliant Energy Center designated Representative.
- E. Provide unimpeded access for emergency vehicles. Maintain 20 foot wide driveways with turning space between and around combustible materials.
- F. Provide and maintain access to fire hydrants free of obstructions.
- G. Provide means of removing mud from vehicle wheels before entering city streets.
- H. Use existing on-site roads for construction traffic, tracked vehicles not allowed on paved areas.

1.13 PARKING

- A. Paved surface parking areas are available to accommodate construction personnel.
- B. Locate as approved at pre-construction meeting.

- C. Use of existing on-site streets and driveways used for construction traffic is permitted. Tracked vehicles not allowed on paved areas.
- D. Do not allow heavy vehicles or construction equipment in parking areas.
- E. Permanent Pavements And Parking Facilities:
 - 1. Permanent roads and parking areas may be used for construction traffic.
 - 2. Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.
- F. Maintenance:
 - 1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, and ice.
 - 2. Maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.
- G. Removal, Repair:
 - 1. Remove temporary materials and construction at Substantial Completion prior to the Midwest Horse Fair.
 - 2. Remove underground work and compacted materials to depth of 2 feet fill and grade site as specified.
 - 3. Repair existing facilities damaged by use, to original condition.
- H. Mud From Site Vehicles: Provide means of removing mud from vehicle wheels before entering streets.

1.14 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 periodically and dispose off-site.
- E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.15 PROJECT IDENTIFICATION

A. Project Identification Sign:

1. One painted sign, 32 square feet area, bottom 6 feet above ground.
2. Content:
 - a. County will provide list of agencies and sponsors to be designated.
County will provide graphic artwork image of facility.
 - b. Names and titles of Architect/Engineer and Consultants.
 - c. Name of Prime Contractor and major Subcontractors.
3. Graphic Design, Colors, Style of Lettering: Designated by Architect/Engineer.

B. Project Informational Signs:

1. Painted informational signs of same colors and lettering as Project Identification sign, or standard products; size lettering for legibility at 100 feet distance.
2. Provide sign at each field office, storage shed, and directional signs to direct traffic into and within site. Relocate as Work progress requires.
3. Provide municipal traffic agency directional traffic signs to and within site.
4. No other signs are allowed without County permission except those required by law.

C. Design sign and structure to withstand 60 miles/hour wind velocity.

D. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

E. Show content, layout, lettering, and color.

F. Sign Materials:

1. Structure and Framing: New and structurally adequate.
2. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum $\frac{3}{4}$ inch thick, standard large sizes to minimize joints.
3. Rough Hardware: Galvanized
4. Paint and Primers: Exterior quality, two coats; sign background color as selected.
5. Lettering: Exterior quality paint, contrasting colors.

G. Installation:

1. Install project identification sign within 15 days after Notice to Proceed.
2. Erect adjacent to main entrance to site.
3. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
4. Install sign surface plumb and level, with butt joints. Anchor securely.
5. Paint exposed surfaces of sign, supports, and framing.

H. Maintenance: Maintain signs and supports clean, repair deterioration and damage.

- I. Removal: Remove signs, framing, supports, and foundations at completion of Project and restore area.

1.16 TRAFFIC REGULATION

- A. Signs, Signals, And Devices:
 - 1. Post Mounted and Wall Mounted Traffic Control and Informational Signs: As approved by authority having jurisdiction.
 - 2. Automatic Traffic Control Signals: As approved by local jurisdictions.
 - 3. Traffic Cones and Drums, Flares and Lights: As approved by authority having jurisdiction.
 - 4. Flagperson Equipment: As required by authority having jurisdiction.
- B. Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.
- C. Flares And Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.
- D. Haul Routes:
 - 1. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.
 - 2. Confine construction traffic to designated haul routes.
 - 3. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.
- E. Traffic Signs And Signals:
 - 1. Provide signs at approaches to site and on site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
 - 2. Provide, operate, and maintain traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control, and areas affected by Contractor's operations.
 - 3. Relocate as Work progresses, to maintain effective traffic control.
- F. Removal:
 - 1. Remove equipment and devices when no longer required..
 - 2. Repair damage caused by installation.
 - 3. Remove post settings to depth of 2 feet.

1.17 FIRE PREVENTION FACILITIES

- A. Prohibit smoking within 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. Standpipes: Install minimum one standpipe for use during construction before building reaches 40 feet in height.
- D. 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.
 - 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.

1.18 BARRIERS

- A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
- B. Provide barricades and covered walkways required by authorities having jurisdiction for public rights-of-way.
- C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

1.19 ENCLOSURES AND FENCING

- A. Construction: Contractor's option either Commercial grade chain link fence or Plastic construction netting is acceptable.
- B. Provide 6 foot high fence around construction site; equip with vehicular [and pedestrian] gates with locks.
- C. 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.

1.20 SECURITY

- A. Security Program:

1. Protect Work existing premises and Alliant Energy Center operations from theft, vandalism, and unauthorized entry.
2. Initiate program in coordination with Alliant Energy Center's existing security at project mobilization.
3. Maintain program throughout construction period until County acceptance precludes need for Contractor security

B. Entry Control:

1. Restrict entrance of persons and vehicles into Project site.
2. Allow entrance only to authorized persons with proper identification.
3. Maintain log of workers and visitors, make available to County on request.

C. Personnel Identification:

1. Provide identification badge to each person authorized to enter premises.
2. Maintain list of accredited persons, submit copy to Alliant Energy Center on request.
3. Require return of badges at expiration of their employment on the Work.

D. Restrictions:

1. Do not allow cameras on site or photographs taken except by written approval of County.
2. Work only during the times set forth in the Construction Documents unless there is prior approval by the County.

1.21 WATER CONTROL

- A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
- B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.22 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.

1.23 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- B. Minimize surface area of bare soil exposed at one time.

- C. Provide temporary measures including berms, dikes, and drains, and other devices to prevent water flow.
- D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.24 NOISE CONTROL

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

1.25 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.

1.26 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, materials, prior to Final Application for Payment inspection.
- B. Remove underground installations to minimum depth of 2 foot. Grade site as indicated on Drawings.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing and permanent 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 SECTION 01 50 00

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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. Protecting installed construction.
- F. Project record documents.
- G. Operation and maintenance data.
- H. Manual for materials and finishes.
- I. Manual for equipment and systems.
- J. Spare parts and maintenance products.
- K. Product warranties and product bonds.
- L. Maintenance service.

1.2 CLOSEOUT PROCEDURES

- A. Submit written certification that Construction Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Construction Documents and ready for Architect/Engineer's review.
- B. Provide submittals to County required by authorities having jurisdiction.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- D. County will occupy all of building as specified in Section 01 10 00 - Summary {01100 - Summary}.

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. Clean filters of operating equipment.
- E. Clean debris from roofs, gutters, downspouts, and drainage systems.
- F. Clean site; sweep paved areas, rake clean landscaped surfaces.
- G. 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, County 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 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 {01330 - Submittal Procedures} that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to County's personnel two weeks prior to date of final inspection.
- B. Demonstrate Project equipment

- C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with County's personnel in detail to explain all aspects of operation and maintenance.
- E. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at equipment location.
- F. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- G. Required instruction time for each item of equipment and system is specified in individual sections.

1.6 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.

1.7 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 County.

- 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 main 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.

1.8 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. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- D. 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. 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 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. Originals of warranties and bonds.

1.9 MANUAL FOR MATERIALS AND FINISHES

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by County, submit documents within ten days after acceptance.
- C. Submit one copy of completed volumes 15 days prior to final inspection. Draft copy be reviewed and returned after final inspection, with Architect/Engineer comments. Revise content of document sets as required prior to final submission.
- D. Submit two sets of revised final volumes in final form within 10 days after final inspection.
- E. 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.
- F. 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.
- G. 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.
- H. Additional Requirements: As specified in individual product specification sections.
- I. Include listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

1.10 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect/Engineer will review draft and return one copy with comments.

- B. For equipment, or component parts of equipment put into service during construction and operated by County, submit documents within ten days after acceptance.
- C. Submit one copy of completed volumes 15 days prior to final inspection. Draft copy be reviewed and returned [after final inspection], with Architect/Engineer comments. Revise content of document sets as required prior to final submission.
- D. Submit two sets of revised final volumes in final form within 10 days after final inspection.
- E. 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.
- F. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- G. Include color coded wiring diagrams as installed.
- H. 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.
- I. 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.
- J. Include servicing and lubrication schedule, and list of lubricants required.
- K. Include manufacturer's printed operation and maintenance instructions.
- L. Include sequence of operation by controls manufacturer.
- M. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- N. Include control diagrams by controls manufacturer as installed.
- O. Include Contractor's coordination drawings, with color coded piping diagrams as installed.
- P. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- Q. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- R. Include test and balancing reports as specified in Section 01 40 00 - Quality Requirements {01400 - Quality Requirements}.

- S. Additional Requirements: As specified in individual product specification sections.
- T. Include listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

1.11 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.
- B. Deliver to the Work site and place in location as directed.

1.12 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 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 County's permission, submit documents within tendays 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.

1.13 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components indicated in specification sections as required by warranty documents.
- B. Examine system components at frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

- C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.
- D. Do not assign or transfer maintenance service to agent or Subcontractor without prior written consent of County

PART 2 PRODUCTS - Not Used

PART 3 EXECUTION - Not Used

END SECTION 01 70 00

1.3 WASTE MANAGEMENT PLAN

- A. Contractor shall complete WMP and include cost of recycling / reuse in Bid. WMP will be submitted to Public Works Project Engineer within fifteen (15) days of Notice to Proceed date. Copy of blank WMP form is in this Section. Submittal shall include cover letter and WMP form with:
 - 1. Information on:
 - a. Types of waste materials produced as result of work performed on site;
 - b. Estimated quantities of waste produced;
 - c. Identification of materials with potential to be recycled or reused;
 - d. How materials will be recycled or reused;
 - e. On-site storage and separation requirements (on site containers);
 - f. Transportation methods; and
 - g. Destinations.

1.4 REUSE

- A. Contractors and subcontractors are encouraged to reuse as many waste materials as possible. Salvage should be investigated for materials not reusable on site.

1.5 RECYCLING

- A. These materials can be recycled in Dane County area:
 - 1. Wood.
 - 2. Wood Pallets.
 - 3. Fluorescent Lamps.
 - 4. Foam Insulation & Packaging (extruded and expanded).
 - 5. PVC Plastic (pipe, siding, etc.).
 - 6. Asphalt & Concrete.
 - 7. Bricks & Masonry
 - 8. Corrugated Cardboard.
 - 9. Metal.
 - 10. Gypsum Drywall.
 - 11. Shingles.
 - 12. Barrels & Drums.
 - 13. Solvents.

1.6 MATERIALS SORTING AND STORAGE ON SITE

- A. Contractor shall provide separate containers for recyclable materials. Number of containers will be dependent upon project and site conditions.
- B. Contractor shall provide on-site locations for subcontractors supplied recycling containers to help facilitate recycling.

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- C. On-site locations for recyclable materials shall be coordinated with of Public Works Project Engineer and designated Alliant Energy Center Representative.

1.7 LISTS OF RECYCLING FACILITIES PROCESSORS AND HAULERS

- A. Web site www.countyofdane.com/pwht/recycle/categories.aspx lists current information for Dane County Recycling Markets. Contractors can also contact Dane County's Recycling Manager at 608/267-8815, or local city, village, town recycling staff listed at site www.countyofdane.com/pwht/recycle/contacts.aspx. Statewide listings of recycling / reuse markets are available from UW Extension at www4.uwm.edu/shwec/wrmd/search.cfm.

1.8 WASTE MANAGEMENT PLAN FORM

A. Contractor Information:

Name: _____

Address: _____

Phone No.: _____ Recycling Coordinator: _____

MATERIAL	ESTIMATED QUANTITY	DISPOSAL METHOD (CHECK ONE)		RECYCLING / REUSE COMPANY OR DISPOSAL SITE
Salvaged & reused building materials	_____ cu. yds. _____ tons	_____ Recycled	_____ Reused	Name: _____
		_____ Landfilled	_____ Other	
Glass	_____ cu. yds. _____ tons	_____ Recycled	_____ Reused	Name: _____
		_____ Landfilled	_____ Other	
Wood	_____ cu. yds. _____ tons	_____ Recycled	_____ Reused	Name: _____
		_____ Landfilled	_____ Other	
Wood Pallets	_____ units	_____ Recycled	_____ Reused	Name: _____
		_____ Landfilled	_____ Other	
Fluorescent Lamps	_____ cu. ft. _____ lbs.	_____ Recycled	_____ Reused	Name: _____
		_____ Landfilled	_____ Other	
Foam Insulation	_____ cu. ft. _____ lbs.	_____ Recycled	_____ Reused	Name: _____
		_____ Landfilled	_____ Other	
Asphalt & Concrete	_____ cu. ft. _____ lbs.	_____ Recycled	_____ Reused	Name: _____
		_____ Landfilled	_____ Other	
Bricks & Masonry	_____ cu. ft. _____ lbs.	_____ Recycled	_____ Reused	Name: _____
		_____ Landfilled	_____ Other	
PVC Plastic	_____ cu. ft. _____ lbs.	_____ Recycled	_____ Reused	Name: _____
		_____ Landfilled	_____ Other	
Corrugated Cardboard	_____ cu. ft. _____ lbs.	_____ Recycled	_____ Reused	Name: _____
		_____ Landfilled	_____ Other	
Metals	_____ cu. yds. _____ tons	_____ Recycled	_____ Reused	Name: _____
		_____ Landfilled	_____ Other	
Carpet Padding	_____ cu. ft. _____ lbs.	_____ Recycled	_____ Reused	Name: _____
		_____ Landfilled	_____ Other	
Gypsum / Drywall	_____ cu. yds. _____ tons	_____ Recycled	_____ Reused	Name: _____
		_____ Landfilled	_____ Other	

Shingles	_____ cu. yds. _____ tons	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Barrels & Drums	_____ units	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Solvents	_____ gallons	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Other	_____	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Other	_____	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Other	_____	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Other	_____	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____
Other	_____	_____ Recycled _____ Landfilled	_____ Reused _____ Other	Name: _____

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END SECTION 01 74 19

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SECTION 02 41 16 - STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Demolition and removal of buildings.
 - 2. Disconnecting and removing above ground site utilities.
 - 3. Salvaging items for reuse by Owner.
 - a. Reclaimed brick.
 - b. Reclaimed wood plank panels (WD-1.)
 - c. Selected light fixtures.
 - d. Selected plumbing fixtures.
- B. Related Work include the following:
 - 1. Division 01 Section "Summary" for use of the premises and phasing requirements.
 - 2. Division 01 Section "Construction Waste Management and Disposal" for recycling and disposal of nonhazardous demolition wastes and for removal and storage of refrigerant.
 - 3. Work under separate contract for Division 31 Section "Site Clearing" for site clearing and removal of below-grade site improvements not part of building demolition.

1.3 DEFINITIONS

- A. Demolish: Completely remove and legally dispose of off-site.
- B. Recycle: Recovery of demolition waste for subsequent processing in preparation for reuse.
- C. Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner. Include fasteners or brackets needed for reattachment elsewhere.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.5 SUBMITTALS

- A. Qualification Data: For refrigerant recovery technician.
- B. Proposed Protection Measures: Submit informational report, including drawings, that indicates the measures proposed for protecting individuals and property , for environmental protection , for dust control and , for noise control. Indicate proposed locations and construction of barriers.
 - 1. Adjacent Buildings: Detail special measures proposed to protect adjacent buildings to remain.
- C. Schedule of Building Demolition Activities: Indicate the following:
 - 1. Detailed sequence of demolition work, with starting and ending dates for each activity.
 - 2. Temporary interruption of utility services.
 - 3. Shutoff and capping or re-routing of utility services.
- D. Building Demolition Plans: Drawings indicating the following:
 - 1. Locations of temporary protection and means of egress for adjacent occupied buildings.
- E. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.
- F. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
- G. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.6 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Standards: Comply with ANSI A10.6 and NFPA 241.
- D. Predemolition Conference: Conduct conference at Project site. Review methods and procedures related to building demolition including, but not limited to, the following:

1. Inspect and discuss condition of construction to be demolished.
2. Review structural load limitations of existing structures.
3. Review and finalize building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review and finalize protection requirements.
5. Review procedures for noise control and dust control.
6. Review procedures for protection of adjacent buildings.
7. Review items to be salvaged and returned to Owner.

1.7 PROJECT CONDITIONS

- A. Buildings to be demolished will be vacated and their use discontinued before start of the Work.
- B. Buildings immediately adjacent to demolition area will be occupied. Conduct building demolition so operations of occupied buildings will not be disrupted.
 1. Provide not less than 72 hours' notice of activities that will affect operations of adjacent occupied buildings.
 2. Maintain access to existing walkways, exits, and other facilities used by occupants of adjacent buildings.
 - a. Do not close or obstruct walkways, exits, or other facilities used by occupants of adjacent buildings without written permission from authorities having jurisdiction.
- C. Owner assumes no responsibility for buildings and structures to be demolished.
 1. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
 2. Before building demolition, Owner will remove the following items:
 - a. Selected, but not all plumbing fixtures.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 1. Hazardous materials will be removed by Owner before start of the Work.
 2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. On-site storage or sale of removed items or materials is not permitted.

1.8 COORDINATION

- A. Arrange demolition schedule so as not to interfere with Owner's on-site operations operations of adjacent occupied buildings.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 DEMOLITION CONTRACTORS

A. Qualified Demolition Contractor:

1. Demolition Personnel: Engage experienced technicians that specializes in demolition work similar in material and extent to that indicated for this Project.

3.2 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting demolition operations.
- B. Review Project Record Documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during building demolition operations.
- D. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

3.3 PREPARATION

- A. Refrigerant: Remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction before starting demolition.
- B. Existing Utilities: Locate, identify, disconnect, and seal or cap off indicated utilities serving buildings and structures to be demolished.
 1. Owner will arrange to shut off indicated utilities when requested by Contractor.
 2. Arrange to shut off indicated utilities with utility companies.
 3. If removal, relocation, or abandonment of utility services will affect adjacent occupied buildings, then provide temporary utilities that bypass buildings and structures to be demolished and that maintain continuity of service to other buildings and structures.
 4. Cut off pipe or conduit a minimum of 24 inches below grade. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing according to requirements of authorities having jurisdiction.

- C. Existing Utilities: Refer to Divisions 22 and 26 Sections for shutting off, disconnecting, removing, and sealing or capping utilities. Do not start demolition work until utility disconnecting and sealing have been completed and verified in writing.
- D. Temporary Shoring: Provide and maintain interior and exterior shoring, bracing, or structural support to preserve stability and prevent unexpected movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of demolition.
- E. Salvaged Items: Comply with the following:
 - 1. Clean salvaged items of dirt and demolition debris.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to storage area designated by Owner.
 - 5. Protect items from damage during transport and storage.
 - 6. In the case of the salvaged light fixtures, other additional requirements may be required as specified in a Division 26 section.

3.4 PROTECTION

- A. Existing Facilities: Protect adjacent walkways, loading docks, building entries, and other building facilities during demolition operations. Maintain exits from existing buildings.
- B. Existing Utilities: Maintain utility services to remain and protect from damage during demolition operations.
 - 1. Do not interrupt existing utilities serving adjacent occupied or operating facilities unless authorized in writing by Owner and authorities having jurisdiction.
 - 2. Provide temporary services during interruptions to existing utilities, as acceptable to Owner and authorities having jurisdiction.
 - a. Provide at least 72 hours' notice to occupants of affected buildings if shutdown of service is required during changeover.
- C. Temporary Protection: Erect temporary protection, such as walks, fences, railings, canopies, and covered passageways, where required by authorities having jurisdiction and as indicated.
 - 1. Protect adjacent buildings and facilities from damage due to demolition activities.
 - 2. Protect existing site improvements, appurtenances, and landscaping to remain.
 - 3. Erect a plainly visible fence around drip line of individual trees or around perimeter drip line of groups of trees to remain.
 - 4. Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 5. Provide protection to ensure safe passage of people around building demolition area and to and from occupied portions of adjacent buildings and structures.

6. Protect walls, windows, roofs, and other adjacent exterior construction that are to remain and that are exposed to building demolition operations.
 7. Erect and maintain dustproof partitions and temporary enclosures to limit dust, noise, and dirt migration to occupied portions of adjacent buildings.
- D. Remove temporary barriers and protections where hazards no longer exist. Where open excavations or other hazardous conditions remain, leave temporary barriers and protections in place.

3.5 DEMOLITION, GENERAL

- A. General: Demolish indicated existing buildings completely. Use methods required to complete the Work within limitations of governing regulations and as follows:
1. Do not use cutting torches until work area is cleared of flammable materials. Maintain portable fire-suppression devices during flame-cutting operations.
 2. Maintain fire watch during and for at least 2 hours after flame cutting operations.
 3. Maintain adequate ventilation when using cutting torches.
 4. Locate building demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- B. Engineering Surveys: During demolition, perform surveys to detect hazards that may result from building demolition activities.
- C. Site Access and Temporary Controls: Conduct building demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by authorities having jurisdiction.
 2. Use water mist and other suitable methods to limit spread of dust and dirt. Comply with governing environmental-protection regulations. Do not use water when it may damage adjacent construction or create hazardous or objectionable conditions, such as ice, flooding, and pollution.
- D. Explosives: Use of explosives is not permitted.

3.6 DEMOLITION BY MECHANICAL MEANS

- A. Proceed with demolition of structural framing members systematically, from higher to lower level. Complete building demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- B. Remove debris from elevated portions of the building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
1. Remove structural framing members and lower to ground by method suitable to minimize ground impact and dust generation.

- C. Salvage: Items to be salvaged are indicated on Drawings and below:
 - 1. Selected plumbing fixtures salvaged by Owner with others to remain for demolition.
 - 2. WD-1 and Brick as salvaged by Owner.
- D. Below-Grade Construction: Demolish foundation walls and other below-grade construction that are within footprint of new construction and extending 5 feet outside footprint indicated for new construction. Abandon below-grade construction outside this area.
 - 1. Remove below-grade construction, including basements, foundation walls, and footings, completely.
- E. Existing Utilities: Demolish existing utilities and below-grade utility structures completely within the area which is 5 feet outside footprint indicated for new construction. Utility pipes that are below the excavation and fill area (e.g. sanitary sewer and water main) may be abandoned. Abandon all other utilities outside this area.
- F. Fill abandoned utility structures with satisfactory soil materials or recycled pulverized concrete according to backfill requirements in Division 31 Section "Earth Moving."
- G. Piping: Disconnect piping at unions, flanges, valves, or fittings.
- H. Wiring Ducts: Disassemble into unit lengths and remove plug-in and disconnecting devices.

3.7 SITE RESTORATION

- A. Below-Grade Areas: Completely fill below-grade areas and voids resulting from building demolition operations with satisfactory soil materials or recycled pulverized concrete according to backfill requirements in Division 31 Section "Earth Moving."
- B. Site Grading: Uniformly rough grade area of demolished construction to a smooth surface, free from irregular surface changes. Provide a smooth transition between adjacent existing grades and new grades.

3.8 REPAIRS

- A. Promptly repair damage to adjacent buildings caused by demolition operations.

3.9 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site. See Division 01 Section "Construction Waste Management and Disposal" for recycling and disposal of demolition waste.
- B. Do not allow demolished materials to accumulate on-site.

- C. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- D. Do not burn demolished materials.

3.10 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by building demolition operations. Return adjacent areas to condition existing before building demolition operations began.

END OF SECTION 02 41 16

SECTION 02 56 39 - TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes general protection and pruning of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.
- B. Related Sections:
 - 1. Section 31 10 00 "Site Clearing" for removing existing trees and shrubs.

1.3 DEFINITIONS

- A. Caliper: Diameter of a trunk measured by a diameter tape at 6 inches above the ground for trees up to, and including, 4-inch size; and 12 inches above the ground for trees larger than 4-inch size.
- B. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction, and indicated on Drawings.
- C. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PROJECT CONDITIONS

- A. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Foot traffic.
 - 4. Erection of sheds or structures.
 - 5. Impoundment of water.
 - 6. Excavation or other digging unless otherwise indicated.
 - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

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- B. Do not direct vehicle or equipment exhaust toward protection zones.
- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Protection-Zone Fencing: Fencing fixed in position and meeting the following requirements. Previously used materials may be used when approved by Architect.
 - 1. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch maximum opening in pattern and weighing a minimum of 0.4 lb/ft.; remaining flexible from minus 60 to plus 200 deg F; inert to most chemicals and acids; minimum tensile yield strength of 2000 psi and ultimate tensile strength of 2680 psi; secured with plastic bands or galvanized-steel or stainless-steel wire ties; and supported by tubular or T-shape galvanized-steel posts spaced not more than 8 feet apart.
 - a. Height: 4 feet.
 - b. Color: High-visibility orange, nonfading.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.

3.2 PREPARATION

- A. Locate and clearly identify trees, shrubs, and other vegetation to remain. Flag each tree trunk at 54 inches above the ground.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

3.3 TREE- AND PLANT-PROTECTION ZONES

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones before materials or equipment are brought on the site and construction operations begin in a manner that will prevent people from easily entering protected area except by entrance gates. Construct fencing so as not to obstruct safe passage or visibility at vehicle

intersections where fencing is located adjacent to pedestrian walkways or in close proximity to street intersections, drives, or other vehicular circulation.

- B. Maintain protection zones free of weeds and trash.
- C. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.
- D. Maintain protection-zone fencing and signage in good condition as acceptable to Architect and remove when construction operations are complete and equipment has been removed from the site.

3.4 ROOT PRUNING

- A. Root Pruning at Edge of Protection Zone: Prune roots flush with the edge of the protection zone, by cleanly cutting all roots to the depth of the required excavation.

3.5 CROWN PRUNING

- A. Prune branches that are affected by temporary and permanent construction. Prune branches as follows:
 - 1. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during Contract period as recommended by arborist.
 - 2. Pruning Standards: Prune trees according to ANSI A300 (Part 1).
 - 3. Cut branches with sharp pruning instruments; do not break or chop.
 - 4. Do not apply pruning paint to wounds.
- B. Chip removed branches and dispose of off-site.

3.6 REGRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- B. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.

3.7 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.
 - 1. Submit details of proposed root cutting and tree and shrub repairs.

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2. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
 3. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
 4. Perform repairs within 24 hours.
 5. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Architect.
- B. Trees: Remove and replace trees indicated to remain that are more than 25 percent dead or in an unhealthy condition or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.
1. Provide new trees of same size and species as those being replaced for each tree that measures 6 inches or smaller in caliper size.
 2. Provide two new tree(s) of 4-inch caliper size for each tree being replaced that measure more than 6 inches in caliper size.
 - a. Species: Species selected by Architect.
 3. Plant and maintain new trees as specified in Section 329300 "Plants."

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

END SECTION 02 56 39

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes the following:

1. Foundations and footings
2. Slabs-on-grade
3. Topping on precast plank
4. Foundation walls
5. Equipment pads and bases
6. Fill for steel pan stairs

- B. Related Sections: The following sections contain requirements that relate to this Section:

1. Division 3 Section "Precast Structural Concrete" for structural precast concrete.
2. Division 3 Section "Concrete Sealers And Hardeners" for concrete hardener.
3. Divisions 21 through 24, for equipment pads and base requirements.
4. Division 31 Section "Earth Moving."
5. Division 32 Section "Concrete Paving" for concrete paving and walks.

- C. Mockups:

1. Mockups General: Prior to placement of concrete elements at this facility, specific mock-ups are required for review and approval by the owner for acceptance of finish. Build mockups to comply with the following requirements, using materials indicated for the completed work:

- a. Build mockups in the location and of the size indicated or, if not indicated, as directed by A/E.
- b. Notify A/E in advance of dates and times when mockups will be constructed.
- c. Obtain A/E's approval of mockups before starting fabrication.
- d. In presence of A/E, damage part of an exposed face for each finish, color, and texture, and demonstrate materials and techniques proposed for repairs to match adjacent undamaged surfaces.
- e. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
- f. Demolish and remove mockups when directed.

2. Provide mockups for the following slab-on-grade locations:

- a. Prior to placement of the slab-on-grades at this facility a slab-on-grade mock-up is required for review and approved by the owner for acceptance of finish for the movement of livestock on the slab-on-grade. Construct at 10 foot square slab-on-grade mockup to verify slab-on-grade finish. Mockup to be representative of the finished slab-on-grade in all respects including slab-on-grade finish, a construction joint and control joint, applied coating, sealants used for construction or control joints, expansion joint filler adjacent to a vertical wall, and cold weather protection for freshly placed concrete. Build mockups to comply with the following requirements, using materials indicated for the completed work:
- b. Pavilions' interior slab-on-grade representative of Pavilion Building 1, Room 120 and Building 2, Room 131.
- c. Colonnade exterior slab-on-grade representative of Pavilion Buildings 1 and 2, between gridlines A to B, and G to H.
- d. Exterior Entrance Apron at Milking Parlor at gridline B between gridlines 20 and 21
- e. Exterior Wash Bay exterior slab-on-grade representative of Pavilion Buildings 1 and 2, reference detail 1/A211B.
- f. Acceptable in-place mockups may become part of the completed Work.
- g. Bid Alternate #3: Building F interior slab-on-grade, Room 170 – Storage.
- h. Bid Alternate #4: Mockups will need to demonstrate that the fibers within the fiber reinforced concrete slabs will not project above the top of slab surface or interfere with the scheduled slab finishes.

3. Provide Concrete Wall Mockup as follows:

- a. Prior to casting of the concrete walls at this facility a concrete wall mock-up is required for review and approved by the owner for acceptance of finish. Construct at 8 linear foot concrete wall mockup to demonstrate finish product effects and qualities of materials and execution. Mockup to be representative of the finished concrete wall in all respects including surface finish, patching of form spreader plu holes, blow-outs at tie rod holes, irregularities, fins, honeycomb, a construction joint and control joint, sealants used for construction or control joints, expansion joint filler adjacent to a vertical wall, and cold weather protection for freshly placed concrete. Build mockups to comply with the following requirements, using materials indicated for the completed work:
- b. Acceptable in-place mockup may become part of the completed Work.

4. Mockups are not required for Building E – Maintenance.

D. Bid Alternate:

1. The base bid for slabs is based on the use of welded wire reinforcing (WWF). Bid Alternate #4 has been established to create a bid alternate for the use of fiber reinforced concrete.

1.3 QUALITY ASSURANCE:

- A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:
 - 1. ACI 117 Standard Specifications for Tolerances for Concrete Construction and Materials
 - 2. ACI 302 Guide for Concrete Floor and Slab Construction
 - 3. ACI 301 "Specifications for Structural Concrete for Buildings."
 - 4. ACI 318 "Building Code Requirements for Reinforced Concrete."
 - 5. Concrete Reinforcing Steel Institute, "Manual of Standard Practice."
 - 6. Wisconsin Department of Transportation "Standard Specifications for Highway and Structure Construction" (WISDOT.)
- B. Concrete Testing Service: Shall be performed by the Owner.
- C. Materials and installed work may require testing and retesting, as directed by Architect, at anytime during progress of work. Allow free access to material stockpiles and facilities. Tests, not specifically indicated to be done at Owner's expense, including retesting of rejected materials and installed work, shall be done at Contractor's expense.

1.4 ALLOWABLE TOLERANCES

- A. Flatwork tolerance for random-traffic floors should be measured in accordance with ASTM E1155.
- B. When area of slab surface within 2 feet of construction joints exceeds 25 percent of slab surface, entire surface area shall be tested, including those areas within 2 feet of construction joints.
- C. Floor tolerance measurements shall be made within 16 hours after completion of final troweling operation, and where applicable, before removal of supporting shores.
- D. Floor slabs shall conform to the following ACI F-number requirements unless noted otherwise:
 - 1. Slab-On-Grade:
 - Specified Overall Values - F_F30/F_L20
 - Minimum Local Values - F_F15/F_L10
 - 2. Unshored Suspended Slabs:
 - Specified Overall Value - FF25
 - Minimum Local Value - F_F15
- E. See ACI 117 for other tolerances not stated herein.

1.5 SUBMITTALS:

- A. Product Data: Submit manufacturer's product data with application and installation instructions for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, joint systems, curing compounds, dry-shake finish materials, and others as requested by Architect.

- B. Shop Drawings:
1. Reinforcement: Submit shop drawings (one sepia and one print each) for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement required and openings through concrete structures.
 2. Formwork: Submit shop drawings for fabrication and erection of specific finished concrete surfaces as indicated. Show general construction of forms including jointing, special form joint or reveals, location and pattern of form tie placement, and other items which affect exposed concrete visually.
 3. Architect's review is for general architectural applications and features only. Design of formwork for structural stability and efficiency is Contractor's responsibility.
- C. Samples: Submit samples of materials as specified and as otherwise requested by Architect, including names, sources and descriptions.
- D. Laboratory Test Reports: Submit laboratory test reports for concrete materials and mix design test as specified.
- E. Material Certificates: Provide material certificates in lieu of materials laboratory test reports when permitted by Architect. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.
- F. Concrete Mix Design: Submit mix designs in conformance with guidelines in this specification.

PART 2 - PRODUCTS

2.1 FORM MATERIALS:

- A. Form for Exposed Finish Concrete: Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.
1. Use overlaid plywood complying with U.S. Product Standard PS-1 "B-B High Density Overlaid Concrete Form," Class I.
 2. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood," Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.
- B. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal or other acceptable material. Provide

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lumber dressed on at least 2 edges and one side for tight fit.

- C. Forms for Textured Finish Concrete: Form textured finish concrete surfaces with units of face design, size, arrangement and configuration as shown on drawings or as required to match Architect's control sample. Provide solid backing and form supports to ensure stability of textured form liners.
- D. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

2.2 REINFORCING MATERIALS:

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Steel Wire: ASTM A 82, plain, cold-drawn, steel.
- C. Welded Wire Fabric (WWF): ASTM A 185, welded steel wire fabric.
- D. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI recommendations, unless otherwise acceptable.
 - 1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
 - 2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected, stainless steel protected, or special stainless complying with CRSI Classes C, D, or E, respectively.

2.3 CONCRETE MATERIALS:

- A. Portland Cement: ASTM C 150, Type I, unless otherwise acceptable to Architect. Use one brand of cement throughout project, unless otherwise acceptable to Architect.
- B. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete. Local aggregates not complying with ASTM C 33 but which have shown by special test or actual service to produce concrete of adequate strength and durability may be used when acceptable to the Architect.
- C. Slag Cement:
 - 1. For normal concrete, slag cement shall meet requirements of ASTM C989, Grade 100 or Grade 120 ground granulated blast-furnace slag, or
 - 2. Slag cement shall meet requirements of ASTM C595, Type I(SM) or Type I(S) interground or blended cement.
- D. Flyash, conforming with the following standards:
 - 1. ASTM C311 "Standard Test Methods for Sampling and Testing Fly Ash or

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- Natural Pozzolans for Use as a Mineral Admixture in Portland-Cement Concrete".
2. ASTM C618 "Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete", Class C.
- E. Water: Potable.
- F. Air-Entraining Admixture: ASTM C 260.
- G. Water-Reducing Admixture: ASTM C 494, Type A.
1. Products: Subject to compliance with requirements, provide one of the following:

"Eucon WR-75"; Euclid Chemical Co.
"Pozzolith 220N"; Master Builders.
"Plastocrete 160"; Sika Chemical Corp.
"Chemtard"; Chem-Masters Corp.
- H. High-Range Water-Reducing Admixture (Super Plasticizer): ASTM C 494, Type F.
1. Products: Subject to compliance with requirements, provide one of the following:

"WRDA 19"; W.R. Grace
"PSP"; Protex Industries Inc.
"Sikament"; Sika Chemical Corp.
"Eucon Super 37"; Euclid Chemical Co.
"LA-8"; Master Builders
"Rheobuild 1000"; Master Builders
- I. Water-Reducing, Accelerator Admixture: ASTM C 494, Type C or E.
- Products: Subject to compliance with requirements, provide one of the following: (Shall contain no chloride ions)
- "Accelguard HE"; Euclid Chemical Co.
"Pozzolith 122-HE"; Master Builders
"Darex"; W.R. Grace
"Sikacrete"; Sika Chemical Co.
- J. Water-Reducing, Retarding Admixture: ASTM C 494, Type D.
- Products: Subject to compliance with requirements, provide one of the following:
- "Pozzolith 300-R"; Master Builders
"Eucon Retarder 75"; Euclid Chemical Co.
"Daratard"; W.R. Grace
"Plastiment"; Sika Chemical Co.

K. Calcium Chloride: Not permitted.

2.4 RELATED MATERIALS:

A. Waterstops: Provide flat, dumbbell type or center bulb type waterstops at construction joints and other joints as shown. Size to suit joints.

1. Rubber waterstops: Corps of Engineers CRD-C513.
2. Polyvinyl chloride (PVC) waterstops: Corps of Engineers CRD-C572.

B. Nonshrink Grout: CRD-C 588, factory pre-mixed grout.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Type D, Nonmetallic:

"Masterflow 713"; Master Builders
"SonogROUT"; Sonneborn-Contech
"Euco-NS"; Euclid Chemical Co.
"DuragROUT"; L & M Const. Chemical Co.
"Sealtight 588"; W.R. Meadows, Inc.

C. Concrete Slab Poly Fiber Reinforcement System:

1. Reference Bid Alternate #4 for concrete fiber reinforced concrete.

2.

3. Macrosynthetic Fiber Reinforcement: Provide Macrosynthetic fibers complying with the following requirements:

- a. Macrosynthetic fibers shall meet requirements of ASTM C 1116, Paragraph 4.1.3, Type III.
- b. Macrosynthetic fibers shall be monofilament, made of polypropylene or polypropylene/polyethylene blend.
- c. Macrosynthetic fibers shall have a minimum length of 1.50 inches (38 mm).
- d. Specific gravity between 0.90 and 0.95
- e. Macrosynthetic fibers shall have an aspect ratio (length divided by equivalent diameter of fiber) between 60 and 100.
- f. Dosage rate will be calculated as required to comply with ASTM C1018-97 beam test, with equivalent flexural strength, f_{e3} , determined per the Japan Concrete Institute, Standard SF4.

- 1) 5.0 lbs/cubic yard or the addition rate to achieve the concrete required minimum equivalent flexural strength, f_{e3} of 165 psi for a concrete with a compressive strength of 3,500 psi at 28 days. This shall be determined from the manufacturer's test data verifying fiber performance in concrete based on ASTM C1609-05, utilizing the beam size 6" x 6" x 20" (f_{e3}) calculated using JCI-SF4 method.

- g. Macrosynthetic fibers shall be:
 - 2) Grace STRUX[®] 90/40 synthetic fiber
 - 3) Novomesh[®] 950 synthetic fiber by SI Concrete Systems
 - 4) Tuf-Strand SF by Euclid Chemical Company
 - 5) Forta Ferro Macro Fiber by Forta Corporation

- D. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

- E. Moisture-Retaining Cover:
 - 1. One of the following, complying with ASTM C 171.
 - a. Waterproof paper.
 - b. Polyethylene film.

- F. Liquid Membrane-Forming Curing Compound: Federal Spec TT-C-800, Type I, unless other type acceptable to Architect.
 - 1. Products offered by manufacturers to comply with the requirements for membrane-forming curing compounds include the following:
 - "Klearseal"; Setcon Industries
 - "Floor Coat"; Euclid Chemical Co.
 - "MB-429"; Master Builders
 - "Kure N Seal 800"; Sonneborn-Contech
 - "Klorkure 800"; Setcon Industries
 - "Clear Seal 800"; W.R. Grace
 - "Dress and Seal"; L & M Const. Chemicals Co.
 - "Sealco 800"; Gifford-Hill
 - "Sealtight CR-26-GSA"; W.R. Meadows, Inc.
 - "Acrylic Cure" DSG Chemical Div.

- G. Liquid Membrane-Forming Curing Compound: ASTM C 309, Type I, Class B, VOC compliant, unless other type acceptable to Architect.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - "AH Clear Cure WB;" Anti-Hydro International, Inc.
 - "Safe-Cure & Seal 20;" ChemMasters
 - "High Seal;" Conspec Marketing & Manufacturing Co., Inc.
 - "Safe Cure and Seal;" Dayton Superior Corporation
 - "Diamond Clear VOX;" Euclid Chemical Co.
 - "Dress & Seal WB;" L & M Construction Chemicals, Inc.
 - "Vocomp-20;" W.R. Meadows, Inc.
 - "Cure 7 Seal 100E;" Nox-Crete Products Group, Kinsman Corporation
 - "Kure-N-Seal W;" Sonneborn, Div. of ChemRex, Inc.
 - "Cure & Seal 14 percent;" Symons Corporation
 - "Horncure 100;" Tamms Industries Co., Div. of LaPorte Construction

Chemicals of North America

- H. Bonding Compound: Polyvinyl acetate, rewettable type.
1. Products: Subject to compliance with requirements, provide one of the following:
"DSG J-40"; DSG Chemical Div.
"Weldcrete"; Larson Products
"Everbond"; L & M Constr. Chemicals Co.
"EucoWeld"; Euclid Chemical Co.
"Daraweld C"; W.R. Grace
"Sonocrete"; Sonneborn-Contech
"Sealtight Intralok"; W.R. Meadows, Inc.
- I. Epoxy Adhesive: 100 percent solids, two component material suitable for use on dry or damp surfaces.
1. Products: Subject to compliance with requirements, provide one of the following:
"Concresive Standard Liquid"; Master Builders, Inc.
"Sikadur 32 Hi-Mod"; Sika Corp.
"Euco Epoxy System #452 or #620"; Euclid Chemical Co.
"Rezi-Weld 1000"; W.R. Meadows, Inc.
- J. Vapor Retarder: Provide vapor retarder over prepared base course. Provide manufacturer's recommended pipe boots, mastics and gusset tape. Use only materials resistant to decay when tested in accordance with ASTM E154, as follows:
1. Vapor Retarder membrane must have the following qualities:
 - a. Maximum Permeance ASTM E96 0.04 Perms
 - b. Water Vapor Retarder ASTM E1745 Meets or exceeds Class C
 - c. Thickness of Retarder (plastic) ACI 302.1R-96 Not less than 10 mils
 2. Provide one of the following:
 - a. Stego Wrap (10 mil) Vapor Retarder by Stego Industries LLC
 - b. Griffolyn T-85 by Reef Industries
 - c. Moistop Ultra by Fortifiber Industries
- K. Slab-On-Grade Dense Graded Base Course:
1. Provide an 8 inch (maximum) dense-graded base course over the sub-grade.
 2. Provide a ¾ inch dense graded base material per WisDOT Section 305.
 3. Compact dense-graded base course to 95% based on a Modified Dry Density per ASTM D1557.
- L. Slab-On-Grade Granular Choker/Protection Course:

1. Provide a 1 inch (maximum) choker course over granular base course on top of the vapor retarder
2. Provide a clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a No. 4 sieve and 10 to 30 percent passing a No. 100 sieve; meeting deleterious substance limits of ASTM C 33 for fine aggregates.

2.5 PROPORTIONING AND DESIGN OF MIXES:

- A. Prepare design mixes for each type and strength of concrete in accordance with applicable provisions of ASTM C 94. Use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall be the same as used for field quality control testing unless otherwise acceptable to Architect.
- B. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by Architect.
- C. Design mixes to provide normal weight concrete with the following properties, as indicated on drawings and schedules:

MIX PROPORTIONING

<u>Class</u>	<u>Type of Construction</u>	<u>Min. Comp Strength @ 28 Days (PSI)</u>	<u>Max. Agg. Size (In.)</u>	<u>Max W/C Ratio.</u>	<u>Air Entrainment % +/- 1½%</u>	<u>Notes</u>
1	All Footings	3000	1.5	0.68	None	(2)
2	Walls/Piers	3000	0.75	0.53	6.0	(1)(3)
3	Interior Slab on Grade	3500	0.75	0.45	None	(1)(3)(4)(5)
4	Exterior Slab on Grade	4500	0.75	0.45	6.0	(1)(3)(4)(5)
5	Bond Beams/Reinf'd CMU	3000	0.375	0.58	None	(2)
6	Precast Topping	4000	0.75	0.50	None	(1)(3)(4)
7	Metal Pan Stairs	4000	0.375	0.50	None	(3)(4)
8	Miscellaneous Non-Scheduled Concrete Work	3000	0.75	0.55	6.0	(3)

Notes:

- (1) Provide at Contractor's option, a super plasticizer to mix.
- (2) A maximum of 50 percent total replacement of Portland cement with GGBFS (Ground Granulated Blast-Furnace Slag) and fly ash at a 1:1 ratio; up to 350 pounds, with a maximum 25 percent fly ash. If fly ash is used alone, limit maximum replacement to 25 percent.
- (3) A maximum of 30 percent total replacement of Portland cement with GGBFS (Ground Granulated Blast-Furnace Slag) and fly ash at a 1:1 ratio where freeze-thaw durability and exposure to deicers is likely; up to 350 pounds, with a maximum 25 percent fly ash. If fly ash is used alone, limit maximum replacement to 25 percent.
- (4) Reference Bid Alternate #4 for the use of fiber reinforced concrete in lieu of welded wire reinforcing (WWF).
- (5) Provide 3/4" maximum aggregate at base bid. Provide 1 1/2" maximum aggregate at Alternate Bid #4.

2.6 CONCRETE MIXING:

- A. Job-Site Mixing: Mix materials for concrete in appropriate drum type batch machine mixer. For mixers of one cubic yard, or smaller capacity, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of the batch is released. For mixers of capacity larger than one cubic yard, increase minimum 1-1/2 minutes of mixing time by 15 seconds for each additional cubic yard, or fraction thereof.
- B. Provide batch ticket for each batch discharged and used in work, indicating project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.
- C. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified. Delete references for allowing additional water to be added to batch for material with insufficient slump. Addition of water to the batch will not be permitted.
- D. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required. When air temperature is between 85 degrees F and 90 degrees F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 FORMS:

- A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.
- B. Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.
- C. Construct forms complying with ACI 347, to sizes shapes, lines and dimensions shown,

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and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.

- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to prevent swelling and for easy removal.
- E. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.
- F. Chamfer exposed corners and edges as indicated, using wood, metal PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- G. Form Ties:
 - 1. Factory-fabricated, adjustable-length, removable or snapoff metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.
 - 2. Unless otherwise indicated, provide ties so portion remaining within concrete after removal is at least 1-1/2 inch inside concrete.
 - 3. Unless otherwise shown, provide form ties which will not leave holes larger than 1 inch diameter in concrete surface.
- H. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.
- I. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retighten forms and bracing after concrete placement if required to eliminate mortar leaks and maintain proper alignment.

3.2 PLACING REINFORCEMENT:

- A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.
- C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

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- D. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.3 JOINTS:

- A. Construction Joints: Locate and install construction joints, which are not shown on drawings, so as not to impair strength and appearance of the structure, as acceptable to Architect.
- B. Provide keyways at least 1-1/2 inch deep in construction joints in walls, slabs and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs.
- C. Place construction joints perpendicular to the main reinforcement. Continue reinforcement across construction joints.
- D. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Make provisions to support and protect exposed waterstops during progress of work. Fabricate field joints in waterstops in accordance with manufacturer's printed instructions.
- E. Isolation Joints in Slabs-on-Grade: Construct isolation joints in slabs-on-grade at points of contact between slabs on ground and vertical surfaces, such as column pedestals, foundation walls, grade beams and elsewhere as indicated.
- F. Control Joints in Slabs-on-Grade: Construct control joints in slabs-on-grade to form panels of patterns as shown. Use inserts 1/4 inch wide x 1/5 to 1/4 of the slab depth, unless otherwise indicated.
- G. Form control joints by inserting premolded plastic strip into fresh concrete until top surface of strip is flush with slab surface. After concrete has cured, remove inserts and clean groove of loose debris.

3.4 INSTALLATION OF EMBEDDED ITEMS:

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.
- B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

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3.5 PREPARATION OF FORM SURFACES:

- A. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.
- B. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.
- C. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

3.6 CONCRETE PLACEMENT:

- A. **Preplacement Inspection:** Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.
- B. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.
- C. Prior to placing topping on precast concrete plank, broom apply a bonding slurry of 3 parts sand and one part Portland Cement. Do not precede the pour too far, allowing the slurry to dry. Slurry shall remain wet at time of topping deposition.
- D. **General:** Comply with ACI 304, and as herein specified. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.
- E. **Placing Concrete in Forms:** Deposit concrete in forms in horizontal layers not deeper than 18 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints. Maximum length of wall pour is 60 feet between construction joints.
- F. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.
- G. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing

segregation of mix.

- H. Slab-on-grades: Finishes that matches the approved mockups.
- I. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
- J. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
- K. Bring slab surfaces to correct level with straightedge and strikeoff. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
- L. Maintain reinforcing in proper position during concrete placement operations.
- M. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified. When air temperature has fallen to or is expected to fall below 40 degrees F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F, and not more than 80 degrees F at point of placement.
- N. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions or low temperatures in compliance with ACI 306 "Cold Weather Concreting."
- O. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
- P. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.
- Q. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
- R. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 "Hot Weather Concreting". Do not place concrete when air temperature is above 90 degrees F, consult Engineer.
- S. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F. Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing.
- T. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
- U. Wet forms thoroughly before placing concrete. Do not use retarding admixtures unless

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otherwise accepted in mix designs.

3.7 FINISH OF FORMED SURFACES:

- A. Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.
- B. Smooth Form Finish: For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, dampproofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.
- C. Related Unformed Surfaces: At tops of walls, horizontal offsets surfaces occurring adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.

3.8 MONOLITHIC SLAB FINISHES:

- A. Float Finish:
 - 1. Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, or sand-bed terrazzo, and as otherwise indicated.
 - 2. After screeding and consolidating concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Check and level surface plane to a tolerance not exceeding 1/4 inch in 10 feet when tested with a 10 foot straight edge. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- B. Trowel Finish:
 - 1. Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, paint or other thin film finish coating system.
 - 2. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance, and with a surface plane tolerance not exceeding 1/8 inch in 10 feet when tested with a 10 foot straightedge. Grind smooth surface defects which would telegraph through applied floor covering system.

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C. Nonslip Broom Finish:

1. Apply nonslip broom finish to exterior concrete platforms, steps and ramps, and elsewhere as indicated.
2. Immediately after trowel finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.9 CONCRETE CURING AND PROTECTION:

A. General:

1. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
2. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 72 hours.
3. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.

B. Curing Methods: Perform curing of concrete by moist curing, by moisture-retaining cover curing, by membrane curing, and by combinations thereof, as herein specified.

1. Provide moisture curing by following methods:
 - a. Keep concrete surface continuously wet by covering with water.
 - b. Continuous water-fog spray.
 - c. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4 inch lap over adjacent absorptive covers.
2. Provide moisture-cover curing as follows: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Provide membrane curing to slabs as follows:
 - a. Apply membrane-forming curing compound to concrete surfaces as soon as final finishing operations are complete (within 2 hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
 - b. **Do not use membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, dampproofing, membrane roofing,**

flooring, painting, decorative concrete stains and other coatings and finish materials, unless otherwise acceptable to Architect.

- C. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- D. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing compound.
- E. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.
- F. Use moisture curing on all slabs-on-grade.

3.10 REMOVAL OF FORMS:

- A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50 degrees F. for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as beam soffits, joists, slabs and other structural elements, may not be removed in less than 14 days and until concrete has attained design minimum compressive strength at 28-days. Determine potential compressive strength of in place concrete by testing field-cured specimens representative of concrete location or members.
- C. Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.11 REUSE OF FORMS:

- A. Clean and repair surfaces of forms to be reused in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Architect.

3.12 MISCELLANEOUS CONCRETE ITEMS:

- A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.

- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.
- D. Steel Pan and Cast Concrete Stairs: Provide concrete fill for steel pan stair treads and landings and associated items. Screed, tamp, and finish concrete surfaces as scheduled.
- E. Reinforced Masonry: Provide concrete grout for reinforced masonry, lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.
- F. Bid Alternate #4 – Fiber Reinforced Concrete: The use of steel fibers is not permitted.

3.13 CONCRETE SURFACE REPAIRS:

- A. Patching Defective Areas:
 1. Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Architect.
 2. Cut out honeycomb, rock pockets, voids over 1/4 inches in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Before placing cement mortar or proprietary patching compound, thoroughly clean, dampen with water and brush-coat the area to be patched with neat cement grout, or proprietary bonding agent.
- B. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- C. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.
- D. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
- E. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for

trueness of slope, in addition to smoothness, using a template having required slope.

- F. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, included crazing, cracks in excess of 0.01 inch wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.
- G. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
- H. Correct low areas in unformed surfaces during, or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect.
- I. Repair defective areas, except random cracks and single holes not exceeding 1 inch diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4 inch clearance all around. Dampen concrete surfaces in contact with patching concrete and brush with a neat cement grout, or apply a concrete bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.
- J. Repair isolated random cracks and single holes not over 1 inch in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and brush with neat cement grout, or apply concrete bonding agent. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.
- K. Use epoxy-based mortar for structural repairs, where directed by Architect.

3.14 QUALITY CONTROL TESTING DURING CONSTRUCTION:

- A. The Owner will employ a testing laboratory to perform tests and submit test results and will pay the cost of testing. Contractor shall coordinate the work and time schedule of testing with Owner's testing agency.
- B. Sampling and testing for quality control during placement of concrete shall include the following enumerated list. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - 1. Slump: ASTM C 143; one test for each concrete load at point of discharge; and one test for each set of compressive strength test specimens.
 - 2. Air Content: ASTM C 173, volumetric method for lightweight concrete; ASTM C 231 pressure for normal weight concrete; one for each set of compressive strength test specimens.
 - 3. Concrete Temperature: Test hourly when air temperature is 40 degrees F and below, and when 80 degrees F, and above; and each time a set of compression

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- test specimens made.
4. Compression Test Specimen: ASTM C 31; one set of 4 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
 5. Compressive Strength Tests: ASTM C 39; one set for each 100 cubic yards. or fraction thereof, of each concrete class placed in any one day or for each 5,000 sq. ft. of surface area placed; 1 specimen tested at 7 days, 2 specimens tested at 28 days, and one specimen retained in reserve for later testing if required.
- C. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
 - D. When total quantity of a given class of concrete is less than 50 cubic yards, strength test may be waived by Architect if, in his judgment, adequate evidence of satisfactory strength is provided.
 - E. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 - F. Test results shall be reported in writing to Architect and Contractor on same day that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.
 - G. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.
 - H. Slab-on-Grade Base: Reference Earth Moving, Section 31 20 00 placement, consolidation requirements, and consolidation testing requirements.

END SECTION 03 30 00

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SECTION 03 35 00 - CONCRETE SEALERS AND HARDENERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to Work of this Section.
- B. Section Includes:
 - 1. Sealer for natural concrete floors.
 - 2. Hardener for natural concrete floors.
- C. Related Sections:
 - 1. Division 3 Section "Cast-In-Place Concrete" for general applications of concrete.
 - 2. Division 7 Section "Joint Sealants" for colored sealant for joints.

1.2 SUBMITTALS

- A. Product Data: Manufacturer's technical data sheets and installation instructions for each product specified.
- B. Samples for Initial Selection: Manufacturer's color charts showing full range of colors available.
- C. Qualification Data: For firms indicated in "Quality Assurance" Article, including lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.3 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. Products shall comply with the United States Clean Air Act for maximum Volatile Organic Compound (VOC) content as specified in PART 2 of this section.
- B. Source Limitations: Obtain each specified material from same source and maintain high degree of consistency in workmanship throughout Project.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver the specified products in original, unopened containers with legible manufacturer's identification and information.
- B. Store specified products in conditions recommended by the manufacturer.

1.5 PROJECT CONDITIONS

- A. Environmental Conditions: Maintain an ambient temperature of between 50 degrees and 90 degrees F during application and at least 48 hours after application.
- B. Protection: Precautions shall be taken to avoid damage or contamination of any surfaces near the work zone. Protect completed stain work from moisture or contamination.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Sealers:
 - 1. Basis-Of-Specification Manufacturer: L.M. Scofield Company, Douglasville, Georgia and Los Angeles, California (800) 800-9900 or the appropriate local contact: Eastern Division – 201-672-9050; Western Division – 714-568-1870; Central Division Office – 630-752-9424
 - 2. Subject to compliance with requirements, other Architect pre-approved products formulated for uses indicated may be used in the Work.
 - 3. Materials:
 - a. SCOFIELD® Cureseal-W™ Semi-gloss (CS-1); L.M. SCOFIELD COMPANY, a clear curing and sealing compound for protecting concrete hardscapes and floors.
- B. Sealer and Hardener (CS-2):
 - 1. Basis-Of-Specification Manufacturer: L&M Construction Chemicals, Inc., 14851 Calhoun Road, Omaha, NE 68152; 402-453-6600; www.lmcc.com.
 - 2. Subject to compliance with requirements, other Architect pre-approved products formulated for uses indicated may be used in the Work.
 - 3. Materials:
 - a. "SEAL HARD" Chemical hardener and sealer.
 - b. "AQUA PEL" sealer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions: Contractor shall examine areas and conditions under which work will be performed and identify conditions detrimental to proper and timely completion of work. Do not proceed until unsatisfactory conditions have been corrected.
- B. Compliance with Manufacturer's Instructions: Contractor shall obtain, understand and comply with the current versions of the manufacturer's technical data sheets and installation instructions. Wherever technical data such as preparation or installation instructions differs from language in this specification or other written material, the information submitted to Architect prior to start of Work.

3.2 PREPARATION

- A. New Concrete:
 - 1. Newly placed concrete shall be sufficiently cured to allow concrete to become reactive, minimum 14 days.
 - 2. Do not use liquid curing materials.
 - 3. Surfaces shall be cured using the same method and different sections (pours.)
 - 4. Immediately prior to sealing, thoroughly clean the concrete. Sweep surfaces, then pressure wash or scrub using a rotary floor machine. Use suitable, high quality commercial detergents to facilitate cleaning. Rinse surfaces after cleaning until rinse water is completely clean.

3.3 APPLICATION OF SEALER

- A. Concrete substrate shall be completely dry.
- B. Test surface for proper PH level prior to applying sealer.
- C. Apply sealer according to manufacturer's written instructions at a rate of 300 to 500 square feet per gallon per coat.
- D. Maintain a wet edge at all times.
- E. Allow sealer to completely dry before applying additional coats.
- F. Apply second coat of sealer at 90 degrees to the direction of the first coat using the same application method and rates.
- G. Seal horizontal joints in areas subject to pedestrian or vehicular traffic.

3.4 APPLICATION OF HARDENER

- A. Concrete substrate shall be completely dry.
- B. Apply hardener in strict compliance with the manufacturer's printed instructions.

3.5 PROTECTION

- A. Protect floor from traffic for at least 72 hours after final application of sealer.

3.6 MAINTENANCE

- A. Maintain chemically stained and sealed floors by sweeping. Clean spills when they occur and rinse dirt off with water. Wet-clean heavily soiled areas by mopping or by scrubbing with a rotary floor machine equipped with a scrubbing brush and a suitable, high quality commercial detergent. Maintain interior floors that require polishing by using a compatible, premium-grade, emulsion-type, commercial floor polish, following manufacturer's instructions and safety requirements.

END SECTION 03 35 35

SECTION 03 41 00 - PRECAST STRUCTURAL CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes structural precast concrete units, including the following:
1. Hollow slab units
- B. Related Sections: The following sections contain requirements that relate to this Section.
1. Cast-in-place Concrete is specified in Division 3 Section "Cast-in-Place Concrete."
 2. Joint sealants and backing are specified in Division 7 Section "Joint Sealers." Applied finishes are specified in Division 9 Sections.

1.3 QUALITY ASSURANCE:

- A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except as otherwise indicated:
1. ACI 301 "Specifications for Structural Concrete for Buildings."
 2. ACI 318 "Building Code Requirements for Reinforced Concrete."
 3. Concrete Reinforcing Steel Institute, "Manual of Standard Practice."
 4. Prestressed Concrete Institute MNL 116, "Manual for Quality Control for Plants and Production of Precast Concrete Products."
 5. Prestressed Concrete Institute MNL 120, "Design Handbook, Precast and Prestressed Concrete."
 6. Prestressed Concrete Institute MNL-127, "Recommended Practice for Erection of Precast Concrete."
- B. Fabricator Qualifications: Firms which have from 2 to 5 years successful experience in fabrication of precast concrete units similar to units required for this project will be acceptable. Fabricator must have sufficient production capacity to produce required units without causing delay in work. Fabricator must be producer member of the Prestressed Concrete Institute (PCI) and/or participate in its Plant Certification Program.

- C. Manufacturer shall be a producer member of the Prestressed Concrete Institute (PCI) and participate in its Plant Certification Program.
- D. Fire-resistance Rated Precast Units: Where precast concrete units are shown or scheduled as requiring a fire-resistance classification, provide units tested and listed by UL in accordance with UL specifications or with each unit bearing UL label and marking.
- E. Installation Tolerances: Install precast units without exceeding following tolerance limits:
 - 1. Variations from Plumb: 1/4-inch in any 20 foot run or story height; 1/2-inch total in any 40 foot or longer run.
 - 2. Variations from Level or Elevation: 1/4-inch in any 20 foot run; 1/2-inch in any 40 foot run; total plus or minus 1/2-inch at any location.
 - 3. Variation from Position in Plan: Plus or minus 1/2-inch maximum at any location.
 - 4. Offsets in Alignment of Adjacent Members at Any Joint: 1/16-inch at any 10 foot run; 1/4-inch maximum.

1.4 SUBMITTALS:

- A. Shop Drawings:
 - 1. Submit shop drawings (one sepia and one print each) showing complete information for fabrication and installation of precast concrete units. Indicate member dimensions and cross-section; location, size and type of reinforcement including special reinforcement and lifting devices necessary for handling and erection.
 - 2. Provide layout, dimensions and identification of each precast unit corresponding to sequence and procedure of installation. Indicate welded connections by AWS standard symbols. Detail inserts, connections and joints including accessories and construction at openings in precast units. Indicate camber at initial transfer of prestressing and at time of erection for prestressed units.
 - 3. Provide location and details of anchorage devices that are to be embedded in other construction. Furnish templates if required for accurate placement
 - 4. Include erection procedure for precast units and sequence of erection.
- B. Provide manufacturer's complete design calculations prepared by a structural engineer registered in the state of Wisconsin. Structural Engineer shall seal all drawings required for application for building permits. Indicate design loads, including live loads, concentrated loads and dead loads in addition to structural members.

1.5 DELIVERY, STORAGE AND HANDLING:

- A. Deliver precast concrete units to project site in such quantities and at such times to insure continuity of installation. Store units at project site to ensure against cracking, distortion

and staining or other physical damage and so that markings are visible. Lift and support units at designated lift points.

- B. Deliver anchorage items which are to be embedded in other construction before start of such work. Provide setting diagrams, templates, instructions and directions as required for installation.

PART 2 - PRODUCTS

2.1 FORMWORK:

- A. Provide forms and, where required, form facing materials of metal, plastic, wood or other acceptable material that is nonreactive with concrete and will produce required finish surfaces.
- B. Accurately construct forms, mortar tight, of sufficient strength to withstand pressures due to concrete placing operations, temperature changes and when prestressed, pretensioning and detensioning operations. Maintain formwork to provide completed precast concrete units of shapes, lines and dimensions indicated within specified fabrication tolerances.
- C. Unless forms for plant manufactured prestressed concrete units are stripped prior to detensioning, design forms so that stresses are not induced in precast units due to deformation of concrete under prestress or to movement during detensioning.

2.2 REINFORCING MATERIALS:

- A. Reinforcing Bars: ASTM A 615, Grade 60, unless otherwise indicated.
- B. Low Alloy Steel Reinforcing Bars: ASTM A 706.
- C. Steel Wire: ASTM A 82, plain, cold-drawn, steel.
- D. Welded Wire Fabric: ASTM A 185.
- E. Welded Deformed Steel Wire Fabric: ASTM A 497.
- F. Supports for Reinforcement:
 - 1. Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing, complying with CRSI recommendations.
 - 2. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are hot-dip galvanized, plastic protected or stainless steel protected.

2.3 PRESTRESSING TENDONS:

- A. Uncoated, 7-wire stress relieved strand complying with ASTM A 416. Use grade 250 unless grade 270 required or shown on drawings.

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- B. Strand similar to above, but having size and ultimate strength of wires increased so that ultimate strength of the strand is increased approximately 15 percent or strand with increased strength but with fewer number of wires per strand may be used at manufacturer's option.

2.4 CONCRETE MATERIALS:

- A. Portland Cement: ASTM C 150, Type I or Type III. Use only one brand and type of cement throughout the project, unless otherwise acceptable to Architect.
- B. Aggregates: ASTM C 33.
- C. Water: Potable or free from foreign materials in amounts harmful to concrete and embedded steel.
- D. Air Entraining Admixture: ASTM C 260.
- E. Water Reducing Admixture: ASTM C 494, Type A.
- F. Calcium Chloride: Do not use calcium chloride in precast prestressed concrete.

2.5 CONNECTION MATERIALS:

- A. Steel Plates: Structural quality, hot-rolled carbon steel, ASTM A 283, grade C.
- B. Steel Shapes: ASTM A 36.
- C. Anchor Bolts: ASTM A 307, low-carbon steel bolts, regular hexagon nuts and carbon steel washers.
- D. Finish of Steel Units: Exposed units galvanized per ASTM A 153; others painted with rust inhibitive primer.
- E. Bearing Pads: Provide bearing pads for precast concrete units as indicated below.
 - 1. Use the following at beam bearing locations:
 - a. Plastic shims: Shall be used at hollow core plank locations. Acceptable type and manufacturer is Korolath by Koro.
 - 2. Tempered Hardboard Pads: Not allowed.
- F. Accessories: Provide clips, hangers and other accessories required for installation of project units and for support of subsequent construction or finishes.

2.6 GROUT MATERIALS:

- A. Cement Grout: Portland Cement, ASTM C 150, Type I and clean, natural sand ASTM C 404. Mix at ratio of 1.0 part cement to 3.0 parts sand, by volume with minimum water required for placement and hydration.

- B. Metallic, Shrinkage Resistant Grout: Premixed and packaged ferrous aggregate type complying with CRD-C558, Type M.
- C. NonMetallic, Shrinkage Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining product containing selected silica sands, Portland cement, shrinkage compensating agents, plasticizing and water reducing agents, complying with ASTM C-1107, Grade B.

2.7 PROPORTIONING AND DESIGN OF MIXES:

- A. Prepare design mixes for each type of concrete required.
- B. Design Mixes may be prepared by an independent testing facility or by qualified precast manufacturing plant personnel, at precast manufacturer's option.
- C. Proportion mixes by either laboratory trial batch or field experience methods, using materials to be employed on the project for each type of concrete required, complying with ACI 318.
 - 1. Produce standard weight concrete consisting of specified Portland cement, aggregates, admixtures and water to produce the following properties.
 - a. Compressive strength; 5000 psi minimum at 28 days.
 - b. Release strength for prestressed units: 3500 psi.
 - 2. Produce lightweight concrete consisting of specified Portland cement, aggregates, admixtures and water to produce the following properties.
 - a. Compressive strength; 5000 psi minimum at 28 days. Air dry density; not less than 90 nor more than 115 lbs. per cu. ft.
 - b. Release strength for prestressed units: 3500 psi.
 - 3. Cure compression test cylinders using the same methods as will be used for the precast concrete work.
- D. Submit written reports to Architect of proposed mix for each type of concrete for at least 15 days prior to start of precast unit production. Do not begin concrete production until mixes and evaluations have been reviewed by Architect.
- E. Adjustment to Concrete Mixes: Mix design adjustments may be requested when characteristics of materials, job conditions, weather, test results or other circumstances warrant. Laboratory test data for revised mix designs and strength results must be submitted to and accepted by Architect before using in the work.
- F. Admixtures:
 - 1. Use air-entraining admixture in concrete, unless otherwise indicated.

2. Use water reducing admixtures in strict compliance with manufacturer's directions. Admixtures to increase cement dispersion or provide increased workability for low-slump concrete, may be used, subject to Architect's acceptance.
3. Use amounts as recommended by admixture manufacturer for climatic conditions prevailing at time of placing. Adjust quantities of admixtures as required to maintain quality control.

2.8 FABRICATION:

- A. General: Fabricate precast concrete units complying with manufacturing and testing procedures, quality control recommendations and dimensional tolerances of PCI MNL-116 and as specified for types of units required.
- B. Job Site Mixing: Mix materials for concrete in an acceptable drum type batch machine mixer. For mixers of one cu. yd. or smaller capacity continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released. For mixers of capacity larger than one cu. yd., increase minimum 1-1/2 minutes of mixing time by 15 seconds for each additional cu. yd. or fraction thereof.
- C. Provide a batch ticket for each batch discharged and used in work, indicating project identification name and number, date, mix type, mix time, quantity and amount of water introduced.
- D. Ready Mix Concrete: Comply with requirements of ASTM C 94 and as herein specified. Delete references for allowing additional water to be added to batch for material with insufficient slump. Addition of water to batch will not be permitted.
- E. During hot weather or under conditions contributing to rapid setting of concrete a shorter mixing time than specified in ASTM C 94 may be required. When the air temperature is between 85 degrees F and 90 degrees F reduce mixing and delivery time from 1-1/2 hours to 75 minutes and when air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.
- F. Built-in Anchorages: Accurately position built-in anchorage devices and secure to formwork. Locate anchorages where they do not affect position of main reinforcement or placing of concrete. Do not relocate bearing plates in units unless acceptable to Architect.
- G. Cast-in holes for openings larger than 10 inch diameter or 10 inch square in accordance with final shop drawings. Other smaller holes will be field cut by trades requiring them, as acceptable to Architect.
- H. Coat surfaces of forms with bond-breaking compound before reinforcement is placed. Provide commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces requiring bond or adhesion. Apply in compliance with manufacturer's instructions.
- I. Clean reinforcement of loose rust and mill scale, earth and other materials which reduce or destroy bond with concrete.

- J. Accurately position, support and secure reinforcement against displacement by formwork, construction or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers as required.
- K. Place reinforcement to obtain at least the minimum coverages for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- L. Pretensioning of tendons for prestressed concrete may be accomplished either by single strand tensioning method or multiple strand tensioning method. Comply with PCI MNL-116 requirements.
- M. Place concrete in a continuous operation to prevent formation of seams or planes of weakness in precast units, complying with requirements of ACI 304. Thoroughly consolidate placed concrete by internal and external vibration without dislocation or damage to reinforcement and built-in items.
- N. Identification: Provide permanent markings to identify pick-up points and orientation in structure, complying with markings indicated on final shop drawings. Imprint date of casting on each precast unit on a surface which will not show in finished structure.
- O. Curing by low pressure steam, by steam vapor, by radiant heat and moisture or other similar process may be employed to accelerate concrete hardening and to reduce curing time.
- P. Delay detensioning of prestressed units until concrete has attained at least 70 percent of design stress, as established by test cylinders.
- Q. If concrete has been heat cured, perform detensioning while concrete is still warm and moist to avoid dimensional changes which may cause cracking or undesirable stresses in concrete.
- R. Detensioning of pretensioned tendons may be accomplished either by gradual release of tensioning jacks or by heat cutting tendons using a sequence and pattern to prevent shock or unbalanced loading.
- S. Finish of Formed Surfaces: Provide finishes for formed surfaces of precast concrete as indicated for each type of unit and as follows:
 - 1. Standard Finish: Normal plant run finish produced in forms that impart a smooth finish to concrete. Small surface holes caused by air bubbles, normal form joint marks and minor chips and spalls will be tolerated, but no major or unsightly imperfections, honeycomb or structural defects will be permitted.
- T. Finish of Unformed Surfaces:
 - 1. Apply scratch finish to precast units which will receive concrete topping after installation. Following initial strikeoff, transversely scarify surface to provide ridges approximately 1/4 inch deep.

2.9 HOLLOW SLAB UNITS:

- A. Type: Precast prestressed concrete units with open voids running full length of slabs, produced under a rigid factory inspected process acceptable to Architect.
- B. Furnish units which are free of voids or honeycomb with straight true edges and surfaces.
- C. Provide " Standard Finish" units unless otherwise indicated.
- D. Fabrication: Manufacturer units of concrete materials which will provide a minimum 3500 psi compressive strength at time of initial prestress and a 28 day compressive strength of 5000 psi.
- E. Adequately reinforce slab units to resist transporting and handling stresses.
- F. Include cast-in weld plates where required for anchorage or lateral bracing to structural steel members.
- G. Cooperate with other trades for installation of items to be cast-in hollow slab units. Notify Contractor of items not received in ample time so as to not delay work.
- H. Provide solid, monolithic precast slab units indicated to be an integral part of hollow slab unit system. Design and fabricate solid units to dimensions and details indicated, as specified for hollow slab units.
- I. Provide headers of cast-in-place concrete or structural steel shapes for openings larger than one slab width in accordance with hollow slab unit manufacturer's recommendations.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Erector must examine supporting structure and conditions under which precast concrete work is to be erected and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with installation until unsatisfactory conditions have been corrected in a manner acceptable to Erector.

3.2 INSTALLATION, GENERAL:

- A. Bearing Pads: Install flexible bearing pads where indicated, as precast units are being erected. Set pads on level, uniform bearing surfaces and maintain in correct position until precast units are placed.
- B. Welding: Perform welding in compliance with AWS D 1.0 and D 12.1, including qualification of welders.
- C. Protect units from damage by field welding or cutting operations and provide noncombustible shield as required.

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- D. Repair damaged metal surfaces by cleaning and applying a coat of liquid galvanizing repair compound to galvanized surfaces and compatible primer to painted surfaces.
- E. Powder Actuated Fasteners: Do not use powder actuated fasteners for surface attachment of accessory items in precast, prestressed unit unless otherwise accepted by precast manufacturer.
- F. Grouting Connections and Joints: After precast concrete units have been placed and secured, grout open spaces at connection and joints as follows.
 - 1. Cement Grout consisting of 1 part Portland cement, 2-1/2 parts sand and only enough water to properly mix and for hydration.
 - 2. Shrinkage resistant grout consisting of premixed compound and water to provide a flowable mixture without segregation or bleeding.
 - 3. Provide forms or other acceptable method to retain grout in place until sufficiently hard to support itself. Pack spaces with stiff grout material, tamping until voids are completely filled. Place grout to finish smooth, plumb and level with adjacent concrete surfaces. Keep grouted joints damp for not less than 24 hours after initial set. Promptly remove grout material from exposed surfaces before it hardens.

3.3 PLANT QUALITY CONTROL EVALUATIONS:

- A. The Owner may employ a separate testing laboratory to evaluate precast manufacturer's quality control and testing methods.
- B. The precast manufacturer shall allow Owners testing facility access to materials storage areas, concrete production equipment and concrete placement and curing facilities. Cooperate with Owner's testing laboratory and provide samples of materials and concrete mixes as may be requested for additional testing and evaluation.
- C. Dimensional Tolerances: Units having dimensions smaller or greater than required and outside specified tolerance limits will be subject to additional testing as herein specified.
- D. Precast Units having dimensions greater than required will be rejected if appearance or function of the structure is adversely affected or if larger dimensions interfere with other construction. Repair or remove and replace rejected units as required to meet construction conditions.
- E. Strength of Units: The strength of precast concrete units will be considered potentially deficient if the manufacturing processes fail to comply with any of the requirements which may affect the strength of the precast units, including the following conditions.
 - 1. Failure to meet compressive strength tests requirements.
 - 2. Reinforcement and pretensioning and detensioning of tendons of prestressed concrete, not conforming to specified fabrication requirements.

3. Concrete curing and protection of precast units against extremes in temperature, not as specified.
 4. Precast units damaged during handling and erection.
- F. Testing Precast Units: When there is evidence that strength of precast concrete units does not meet specification requirements, the concrete testing service shall take cores drilled from hardened concrete for compressive strength determination, complying with ASTM C 42 and as follows:
1. Take at least 3 representative cores from precast units of suspect strength, from locations directed by Architect.
 2. Test cores in a saturated-surface-dry condition per ACI 318 if concrete will be wet during use of completed structure.
 3. Test cores in an air dry condition per ACI 318 if concrete will be dry during use of completed structure.
 4. Strength of concrete for each series of cores will be considered satisfactory if their average compressive strength is at least 85 percent of 28 day design compressive strength.
 5. Tests results will be made in writing on same day that tests are made with copies to Architect, Contractor and precast manufacturer. Include in test reports the project identification name and number, date, name of precast concrete manufacturer, name of concrete testing service, identification letter, number and type of member or members represented by core tests, design compressive strength, compression breaking strength and type of break (corrected for length diameter ratio), direction of applied load to core with respect to horizontal plan of concrete as placed and moisture condition of core at time of testing.
- G. Patching: Where core test results is satisfactory and precast units are acceptable for use in work, fill core holes solid with patching mortar and finish to match adjacent concrete surfaces.
- H. Defective Work: Precast concrete units which do not conform to specified requirements, including strength, tolerances and finishes shall be replaced with precast concrete units that meet requirements of this section. The Contractor shall also be responsible for the cost of corrections to any other work affected by or resulting from corrections to precast concrete work.

END SECTION 03 41 00

SECTION 04 20 00 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

A. Work of this section:

1. Extent of each type of masonry work is indicated on drawings.
2. Mortar and Accessory products.
3. Block Sealer.
4. Installation of reclaimed brick.

B. Related sections:

1. Reclaimed brick material from a Division 2 section, Structure Demolition
2. Reinforced unit masonry is specified in another Division 4 section.
3. Foamed-in-place masonry insulation in a Division 7 section.

1.3 QUALITY ASSURANCE:

- A. Fire-Resistance Rated Masonry: Comply with requirements for materials and installation established by governing authorities for the construction and fire-resistance rating indicated.

B. Construction Tolerances:

1. Variation from Plumb: For vertical lines and surfaces of columns, walls and arises do not exceed 1/4 inch in 10 feet, or 3/8 inch in a story height not to exceed 20 feet, nor 1/2 inch in 40 feet or more. For external corners, expansion joints, control joints and other conspicuous lines, do not exceed 1/4 inch in any story or 20 feet maximum, nor 1/2 inch in 40 feet or more.
2. Variation from Level: For lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4 inch in any bay of 20 feet maximum, nor 3/4 inch in 40 feet or more.
3. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls and partitions, do not exceed 1/2 inch in any bay or 20 feet maximum, nor 3/4 inch in 40 feet or more.
4. Variation in Cross-Sectional Dimensions: For columns and thickness of walls, from dimensions shown, do not exceed minus 1/4 inch nor plus 1/2 inch.

1.4 SUBMITTALS:

- A. Product Data: Submit manufacturer's specifications and other data for each type of masonry unit, accessory, and their manufactured products, including certifications that each type complies with specified requirements. Include instructions for handling, storage, installations and protection.

1.5 JOB CONDITIONS:

- A. Protection of Work: During erection, cover top of walls with heavy waterproof sheeting at end of each days' work. Cover partially completed structures when work is not in progress.
- B. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- C. Do not apply uniform concentrated loads for at least 3 days after building walls.
- D. Staining: Prevent grout or mortar from staining the face of masonry to be left exposed or painted. Remove immediately grout or mortar in contact with such masonry.
- E. Protect sills, ledges and projections from droppings of mortar.
- F. Cold Weather Protection:
 - 1. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.
 - 2. Remove all masonry determined to be frozen or damaged by freezing conditions.
 - 3. Perform the following construction procedure while the work is progressing.
 - a. When air temperature is from 40 degrees F to 32 degrees F, heat sand or mixing water to produce mortar temperature between 40 degrees F and 120 degrees F.
 - b. When air temperature is from 32 degrees F to 25 degrees F heat sand or water to produce mortar temperature between 40 degrees F and 120 degrees F; maintain temperature of mortar on boards above freezing.
 - c. When air temperature is from 25 degrees F to 20 degrees F, heat sand and mixing water to produce mortar temperatures between 40 degrees F and 120 degrees F; maintain temperature of mortar on boards above freezing; use salamanders or other heat sources on both sides of walls under construction; use wind breaks when wind is in excess of 15 mph.
 - d. When air temperature is 20 degrees F and below, heat sand and mixing water to produce mortar temperatures between 40 degrees F and 120 degrees F; provide enclosures and auxiliary heat to maintain air temperature above 32 degrees F; do not lay units which have a surface temperature of 20 degrees F.
 - 4. Perform the following protections for completed masonry and masonry not being worked on:
 - a. When the mean daily air temperature is from 40 degrees F to 32 degrees F, protect masonry from rain or snow for at least 24 hours by covering with weather-resistive membrane.

- b. When mean daily air temperature is from 32 degrees F to 25 degrees F, completely cover masonry with weather-resistive membrane for at least 24 hours.
 - c. When mean daily air temperature is from 25 degrees F to 20 degrees F, completely cover masonry with insulating blankets or similar protection for at least 24 hours.
 - d. When mean daily temperature is 20 degrees F and below, maintain masonry temperature above 32 degrees F for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps, or other acceptable methods.
5. At Contractor's option to the above protections, the following may be invoked when acceptable to the Architect:
- a. Changes to a higher type of mortar required in ASTM C270 (if Type N mortar is specified for normal temperatures, change to Type S or Type M).
 - b. Increase the protection time to 48 hours with no change made in the type of mortar.
 - c. Without changing the mortar type and maintaining 24-hour protection, replace Type I Portland cement in the mortar to Type III.

1.6 **WARRANTIES:**

- A. **Installer's Warranty:** Provide limited labor and material warranty for concrete sealer system as specified, signed by Installer, in which Installer agrees to repair or replace installed products that fail in materials or workmanship within specified warranty period.
 - 1. **Warranty Period:** Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 **MASONRY UNITS, GENERAL:**

- A. **Manufacturer:** Obtain masonry units from one manufacturer, of uniform texture and color for each kind required, for each continuous area and visually related areas.

2.2 **BRICK:**

- A. Use reclaimed brick as indicated in the drawings.

2.3 **CONCRETE MASONRY UNITS (CMU):**

- A. **Size:** Manufacturer's standard units with nominal face dimensions of 16 inches long x 8 inches (15-5/8 inches x 7 5/8 inches actual), unless otherwise indicated.
- B. **Special Shapes:** Provide where required for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions.
- C. **Decorative Concrete Masonry Units:**

1. Burnished face units:
 - a. Basis-of-Specification Manufacturer and Product: Provide product as indicated in the "Schedule Of Interior Finishes" or Architect pre-approved equal.
 - b. Manufacturer: Premier Block Corporation, 1111 Menomonie Street, Eau Claire, WI; 888-395-0910 .
 - c. "Ultra" Burnished Units.
 - d. Complying with: ASTM C90.
 - e. Normal weight units.
 - f. Provide special shapes and soaps as required.

- D. Hollow Load-Bearing CMU: ASTM C 90, for general use in exterior walls above and below grade that may or may not be exposed to moisture penetration or the weather, and for interior walls and backup.

- E. Hollow Nonload-Bearing CMU: ASTM C 129 .

- F. Solid Load-Bearing CMU: ASTM C 145, provide Grade N.

- G. Weight: Provide normal weight units using aggregate complying with ASTM C 33 producing dry net unit weight of not less than 125 lbs. per cu. ft., unless otherwise indicated.

- H. Curing:
 1. Cure units by atmospheric drying for not less than 30 days before installation, to comply with ASTM C 90, Type II.

- I. Exposed Faces:
 1. Provide manufacturer's standard texture, unless otherwise indicated.

- J. Provide fire-rated units where rated walls are indicated.

- 2.4 MORTAR MATERIALS:
 - A. Portland Cement: ASTM C 150, Type I, except Type III may be used for cold weather construction.
 1. Provide natural color or white cement as required to produce the required mortar color.

 - B. Masonry Cement: ASTM C 91.

 - C. Mortar Cement: ASTM C 1329.

 - D. Hydrated Lime: ASTM C 207, Type S.

- E. Aggregates: ASTM C 144, except for joints less than 1/4 inch use aggregate graded with 100 percent passing the No. 16 sieve.
 - 1. White Mortar Aggregates: Natural white sand or ground white stone.
 - 2. Color Mortar Aggregates: Ground marble, granite or other sound stone, as required to match Architect's sample.
- F. Colored Mortar Pigments: Commercial iron oxide, manganese dioxide, ultramarine blue, chromium oxide, or carbon black, compounded for use in mortar mixes. Do not exceed pigment-to-cement ratios, by weight of 1-to-35 for carbon black and 1-to-7 for other pigments.
- G. Moisture Resistant Mortar Additive: Ammonium stearate, aluminum tri-stearate or calcium stearate.
- H. Water: Clean, free of deleterious materials which would impair strength or bond.

2.5 MASONRY ACCESSORIES:

- A. Continuous Wire Reinforcing and Ties for Masonry:
 - 1. Provide welded wire units prefabricated in straight lengths of not less than 10 feet, with matching corner and tee units. Fabricate from cold-drawn steel wire complying with ASTM A 82, with deformed continuous side rods and plain cross-rods, and a unit width of 1-1/2 inches to 2 inches less than thickness of wall or partition.
 - 2. Provide units fabricated as follows:
 - a. Truss type fabricated with single pair of 9 gauge side rods and 9 gauge continuous diagonal cross-rods spaced not more than 16 inches on center.
 - b. Reinforcing shall be discontinuous at all movement joints.
 - c. For multi-wythed or stone exterior walls with concrete masonry back-up fabricate units with additional loops for hooked triangular stone ties.
 - d. Provide units with adjustable 2-piece triangular ties where horizontal joints of facing wythe do not align with back-up joints.
 - 3. For interior walls, fabricate from mill galvanized wire.
 - 4. For exterior walls, hot-dip galvanize after fabrication with 1.5 oz. zinc coating, ASTM A 153, Class B2.
- B. Individual Wire Ties for Masonry:
 - 1. Fabricate from 3/16 inch cold-drawn steel wire, ASTM A 82, unless otherwise indicated, of the length required for proper embedment in wythes of masonry.
 - 2. For interior walls, fabricate from steel wire with mill galvanized finish.
 - 3. For exterior walls, fabricate from steel wire with 1.5 oz. hot-dip zinc coating, ASTM A 153 Class B 2, or fabricate from steel wire with not less than 7-mil copper coating, ASTM B 227, Grade 30 HS.
- C. Concrete Inserts for Masonry:

1. Unit Type: Furnish cast iron or malleable iron inserts of the type and size shown, hot-dip galvanized after fabrication with 1.5 oz. zinc coating, ASTM A 153, Class B2.
2. Dovetail Slots: Furnish dovetail slots with filler strips, where shown.
 - a. Fabricate from 24 gauge galvanized steel unless otherwise indicated.
 - b. Provide hot-dip galvanized steel dovetail anchors of the size and type to suit construction requirements.
3. For installation of concrete inserts, see concrete sections of these specifications. Advise concrete Installer of specific requirements regarding his placement of inserts which are to be used by the masonry Installer for anchoring of masonry work.

D. Flashings for Masonry:

1. Provide concealed flashing, shown to be built into masonry.
2. Provide concealed flashings as follows:
 - a. Stainless Steel: AISI Type 302/304, 2D finish, full annealed or dead-soft temper, 0.015 inch thick.
 - b. Provide end dams at the longitudinal ends of flashings over lintels, at column abutments and adjacent to major building expansion joints.
 - c. Flashings shall lap a minimum of 4 inches.
3. Elastic Sheet Flashing/Membrane:
 - a. Manufacturer's standard flexible, elastic, black, nonreinforced, flashing sheet of 50-65 mils thickness; 50-70 Shore A hardness (ASTM D 2240); 1200 psi tensile strength (ASTM D 412); 120 lbs. per lin. in. tear resistance (ASTM D 624, Die C); ultimate elongation of 250 percent (ASTM D 412); brittleness temperature of -30 degrees F (ASTM D 746); resistance to ozone aging of no cracks for 10 percent elongated sample for 100 hours in 50 pphm ozone at 104 degrees F (ASTM D 573); resistance to heat aging of maximum hardness increase of 15 points, elongation reduction of 40 percent, and tensile strength reduction of 30 percent, for 70 hours at 212 degrees F (ASTM D 573).
 - 1) Provide neoprene synthetic rubber sheet.

E. Miscellaneous Masonry Accessories:

1. Reinforcing Bars: Deformed steel, ASTM A 615, Grade 60 of the sizes shown.
2. Metal Expansion Joint Strips: Provide the following formed to the shape shown.
 - a. Stainless Steel: AISI Type 302/304 2D finish, fully annealed or dead-soft temper, 0.015 inch thick.
3. Nonmetallic Expansion Joint Strips: Provide premolded, compressible, elastic fillers of foam rubber, neoprene, or extruded plastic.

4. Bond Breaker Strips: 15-lb. asphalt roofing felt complying with ASTM D 226, or 15-lb, coal-tar roofing felt complying with ASTM D 227.
5. Premolded Control Joint Strips: Solid rubber strips with a Shore A durometer hardness of 60 to 80, designed to fit standard sash block and maintain lateral stability in masonry wall, size and configuration as indicated.
6. Weephole / Ventilators: One piece units made to fit in a vertical mortar joint from polyvinyl chloride in custom color approved by Architect to match mortar. Space at 24 inches on center at elevations shown. Williams Products, Inc., "Williams - Goodco Brick Vent" or Architect approved equal.

2.6 MORTAR AND GROUT MIXES:

- A. Do not lower the freezing point of mortar by use of admixtures or antifreeze agents. Do not use calcium chloride in mortar or grout.
- B. Portland Cement / Lime Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specifications, except limit materials to those specified herein, and limit cement/lime ratio (by volume) as follows:
 1. Type M: 1/4 part lime per part of Portland cement.
 2. Type S: Over 1/4 up to 1/2 part lime per part of Portland cement, for all load bearing walls.
 3. Type N: Over 1/2 up to 1-1/4 parts lime per part of Portland cement, for exterior and interior non-load bearing walls.
 4. Type O: over 1-1/4 up to 2-1/2 part lime per part of Portland cement.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification.

2.6 BLOCK SEALER:

- A. Provide block sealer system for use on burnished block:
 1. Basis-of-Specification manufacturer and product:
 - a. Prosoco, "SureKlean Weather Seal Blok-Guard & Graffiti Control Ultra."
 2. Subject to compliance with requirements, provide specified product or Architect pre-approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL:

- A. Thickness: Build masonry construction to the full thickness shown, except, build single-wythe walls (if any) to the actual thickness of the masonry units, using units of nominal thickness shown or specified.

- B. Cut masonry units with motor-driven saw designed to cut masonry with clean sharp, unchipped edges. Cut units as required to provide pattern shown and to fit adjoining work neatly. Use full units without cutting wherever possible.
- C. Do not wet concrete masonry units.
- D. Frozen Materials and Work: Do not use frozen materials or materials mixed or coated with ice or frost. For masonry which is specified to be wetted, comply with the BIA recommendations. Do not build on frozen work. Remove and replace masonry work damaged by frost or freezing.
- E. Pattern Bond: Lay exposed masonry in the bond pattern shown, or if not shown, lay in running bond vertical joint in each course centered on units in courses above and below. Lay concealed masonry with all units in a wythe bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners, unless otherwise shown. Match coursing, bonding, color and texture of new masonry work with existing work, where indicated.
- F. Layout walls in advance for accurate spacing of surface bond patterns, with uniform joint widths and to properly locate openings, movement-type joints, returns and offsets. Avoid the use of less-than-half size units at corners, jambs and wherever possible at other locations.
- G. Lay-up walls plumb and true and with courses level, accurately spaced and coordinated with other work.
- H. Stopping and Resuming Work: Rack back 1/2-masonry unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if specified to be wetted), and remove loose masonry units and mortar prior to laying fresh masonry.
- I. Built-In Work:
 - 1. As the work progresses, build in items specified under this and other sections of these specifications. Fill in solidly with masonry around built-in items.
 - 2. Fill space between hollow metal frames and masonry solidly with mortar.
 - 3. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
- J. Intersecting Load-Bearing Walls: If carried up separately, block vertical joint with 8 inches maximum offsets and provide rigid steel anchors of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
- K. Intersecting Load-Bearing Walls: If carried up separately, block vertical joint with 8 inches maximum offsets and provide rigid steel anchors spaced not more than 4 feet-0 inches on center vertically, or omit blocking and provide rigid steel anchors at not more than 2 feet-0 inches on center vertically. Form anchors of galvanized steel not less than 1-1/2 inches x 1/4 inch x 2 feet-0 inches long-with ends turned up not less than 2 inches or with cross-pins. If used with hollow masonry units, embed ends in mortar filled cores.
- L. Nonbearing Interior Partition Walls: Build full height of story to underside of solid structure above, unless otherwise indicated.

3.2 MORTAR BEDDING AND JOINTING:

- A. Use Type M mortar for masonry below grade and in contact with earth, interior and exterior loadbearing walls.
- B. Use Type S mortar for exterior above grade loadbearing and nonload-bearing walls, parapet walls, pavements, and for interior loadbearing walls and nonload-bearing partitions.
- C. Use Type O mortar for interior nonload-bearing partitions.
- D. Batch Control:
 - 1. Measure and batch materials either by volume or weight, such that the required proportions for mortar can be accurately controlled and maintained. Measurement of sand exclusively by shovel will not be permitted.
 - 2. Mix mortars with the maximum amount of water consistent with workability to provide maximum tensile bond strength within the capacity of the mortar.
 - 3. Mix mortar ingredients for a minimum of 5 minutes in a mechanical batch mixer. Use water clean and free of deleterious materials which would impair the work. Do not use mortar which has begun to set, or if more than 2-1/2 hours has elapsed since initial mixing. Retemper mortar during 2-1/2 hour period as required to restore workability.
- E. Lay solid masonry units with completely filled bed, head and collar joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints.
- F. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells; also bed webs in mortar in starting course on footings and foundation walls and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or to be filled with concrete or grout.
- G. Joints: Maintain joint widths shown, except for minor variations required to maintain bond alignment. If not otherwise indicated, lay walls with 3/8 inch joints. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials. Tool exposed joints slightly concave. Rake out mortar in preparation for application of caulking or sealants where shown.
- H. Remove masonry units disturbed after laying; clean and relay in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove unit, clean off mortar, and reset in fresh mortar.
- I. Collar Joints: Fill joints between wythes solidly with mortar by parging either the back of the facing, or the face of the backing, and shove units solidly into parging.

3.3 CAVITY WALLS:

- A. Keep cavity clean of mortar droppings and other materials during construction. Strike joints facing cavity, flush.

- B. Tie exterior stone wythe to back-up with individual metal ties spaced not more than 16 inches on center vertically and 24 inches on center horizontally. Stagger in alternate courses.
- C. Provide weep holes in exterior stone wythe of cavity, composite and veneer walls located immediately above ledges and flashing, spaced 2 feet-0 inches on center, unless otherwise indicated.

3.4 STRUCTURAL BONDING OF MULTI-WYTHE MASONRY:

- A. Use individual metal ties embedded in horizontal joints to bond wythes together. Provide ties as shown, but less than one metal tie for 4 square feet of wall area spaced not to exceed 24 inches on center horizontally and vertically. Stagger ties in alternate courses. Provide additional ties within 1 foot-0 inches of all openings and space not more than 3 feet-0 inches apart around perimeter of openings. At intersecting and abutting walls, provide ties at not more than 24 inches on center vertically.
- B. Use continuous joint reinforcing embedded in horizontal joints for bond tie between wythes. Install at not more than 16 inches on center vertically as specified. Provide continuity at corners and intersections using prefabricated "L" and "T" units.

3.5 HORIZONTAL JOINT REINFORCING:

- A. Provide continuous horizontal joint reinforcing as shown and specified. Fully embed longitudinal side rods in mortar for their entire length with a minimum cover of 5/8 inch on exterior side of walls and 1/2 inch at other locations. Lap reinforcement a minimum of 6 inches at ends of units. Do not bridge control and expansion joints with reinforcing, as otherwise indicated. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.
- B. Space continuous horizontal reinforcing as follows:
 - 1. For multi-wythe walls (solid or cavity) where continuous horizontal reinforcing also acts as structural bond or tie between wythe, space reinforcing as required by code but not less than 16 inches on center vertically.
 - 2. For single-wythe walls, space reinforcing at 16 inches on center vertically, unless otherwise indicated.
- C. Reinforce masonry openings greater than 1 foot- 0 inches wide, with horizontal joint reinforcing placed in 2 horizontal joints approximately 8 inches apart, both immediately above the lintel and below the sill. Extend reinforcing a minimum of 2 feet-0 inches beyond jambs of the opening, bridging control joints where provided.

3.6 ANCHORING MASONRY WORK:

- A. Provide anchoring devices of the type shown or as specified. If not shown or specified, provide standard type for facing and back-up involved.

- B. Anchor masonry to structural members where masonry abuts or faces such members to comply with the following:
 - 1. Provide an open space not less than 1 inch in width between masonry and structural member, unless otherwise shown. Keep open space free of mortar or other rigid materials.
 - 2. Anchor masonry to structural members with metal ties embedded in masonry joints and attached to structure. Provide anchors with flexible tie sections, unless otherwise indicated.
 - 3. Space anchors as shown, but not more than 24 inches on center vertically and 36 inches on center horizontally.

3.7 LINTELS:

- A. Install loose lintels of steel and other materials where shown.
- B. Provide masonry lintels where shown and wherever openings of more than 1 foot-0 inches are shown without structural steel or other supporting lintels. Provide precast or formed-in-place masonry lintels. Thoroughly cure precast lintels before handling and installation. Temporarily support formed-in-place lintels.
- C. For hollow concrete masonry unit walls, use specially formed "U"-shaped lintel units with reinforcing bars placed as shown and filled with Type M mortar or concrete grout.
- D. Provide minimum bearing at each jamb, of 4 inches for openings less than 6 foot-0 inches wide, and 8 inches for wider openings.

3.8 CONTROL AND EXPANSION JOINTS:

- A. Provide vertical expansion, control and isolation joints in masonry where shown. Build-in related masonry accessory items as the masonry work progresses.
 - 1. See Division 7 sections for "Joint Sealers."
 - 2. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of flow. Seal joints below grade and at junctures with horizontal expansion joints, if any.
 - 3. Build-in flanges of factory-fabricated expansion joint units, specified in a Division 7 section.
 - 4. Build-in joint fillers where shown, specified in a Division 7 section.
- B. Control Joint Spacing: If location of control joints is not shown, place vertical joints spaced not to exceed 35 feet-0 inches on center for concrete masonry wythes if reinforced, or 30 feet-0 inches on center if not reinforced.

3.9 FLASHING OF MASONRY WORK:

- A. Provide concealed flashings in masonry work at, or above, all shelf angles, lintels, ledges and other obstructions to the downward flow of water in the wall so as to divert such water to the exterior. Prepare masonry surfaces smooth and free from projections, which could puncture flashing. Place through-wall flashing on bed of mortar and cover with mortar. Seal penetrations in flashing with mastic before covering with mortar.

1. Extend flashings the full length of lintels and shelf angles and minimum of 4 inches into masonry each end. Extend flashing from a line 1/2 inch in from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 4 inches, and through the inner wythe to within 1/2 inch of the interior face of the wall in exposed work. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2 inches.
 2. Provide weepholes in the head joints of the same course of masonry bedded in the flashing mortar.
 3. Interlock end joints of deformed metal flashings by overlapping deformations not less than 1-1/2 inches and seal lap with elastic sealant.
 4. Install flashings in accordance with manufacturer's instructions.
- B. Install reglets and nailers for flashing and other related work where shown to be built into masonry work.

3.10 BLOCK SEALER APPLICATION:

- A. Apply block sealer system in strict accordance with manufacturer's printed instructions.
1. In preparation for sealing use only block cleaning materials and methods which are approved by sealer manufacturer.
 2. Engage sealing system manufacturer's official representative to inspect final application to assure that full manufacturer's warranty can be granted.

3.11 REPAIR, POINTING AND CLEANING:

- A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point-up all joints at corners, openings and adjacent work to provide a neat, uniform appearance, properly prepared for application of caulking or sealant compounds.
- C. Use commercial cleaning agents in accordance with manufacturer's instructions.
- D. Clean exposed CMU masonry by dry brushing at the end of each day's work and after final pointing to remove mortar spots and droppings.

END SECTION 04 20 00

SECTION 04 20 30 - REINFORCED UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.
- B. Requirements of Division 4 Section "Unit Masonry" apply to work of this section.

1.2 DESCRIPTION OF WORK:

- A. Extent of each type of reinforced unit masonry work is indicated on drawings and in schedules.

1.3 SUBMITTALS:

- A. Shop Drawings: Submit shop drawings for fabrication, bending, and placement of reinforcement bars. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures". Show bar schedules, diagrams of bent bars, stirrup spacing, lateral ties and other arrangements and assemblies as required for fabrication and placement of reinforcement for unit masonry work.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. General: refer to section "Unit Masonry" for masonry materials and accessories not included in this section.
- B. Reinforcement Bars: Provide deformed bars of following grades complying with ASTM A 615, except as otherwise indicated.
 - 1. Provide Grade 40 for bars No. 3 except as otherwise indicated.
 - 2. Provide Grade 60 for bars No. 4 to No. 18, except as otherwise indicated.
 - 3. Shop-fabricated reinforcement bars which are shown to be bent or hooked.

PART 3 - EXECUTION

3.1 PLACING REINFORCEMENT:

- A. General: Clean reinforcement of loose rust, mill scale, earth, ice or other materials which will reduce bond to mortar or grout. Do not use reinforcement bars with kinks or bends not shown on drawings or final shop drawings, or bars with reduced cross-section due to excessive rusting or other causes.

- B. Position reinforcement accurately at the spacing indicated. Support and secure vertical bars against displacement. Horizontal reinforcement may be placed as the masonry work progresses. Where vertical bars are shown in close proximity, provide a clear distance between bars of not less than the nominal bar diameter or 1 inch (whichever is greater).
- C. Splice reinforcement bars where shown; do not splice at other points unless acceptable to the Architect. Provide lapped splices, unless otherwise indicated. In splicing vertical bars or attaching to dowels, lap ends, place in contact and wire tie.
 - 1. Provide not less than minimum lap indicated, or if not indicated, as required by governing code.
- D. Embed metal ties in mortar joints as work progresses, with a minimum mortar cover of 5/8 inch on exterior face of walls and 1/2 inch at other locations.
- E. Embed prefabricated horizontal joint reinforcement as the work progresses, with a minimum cover of 5/8 inch on exterior face of walls and 1/2 inch at other locations. Lap units not less than 6 inches at ends. Use prefabricated "L" and "T" units to provide continuity at corners and intersections. Cut and bend units as recommended by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures and other special conditions.
- F. Anchoring: Anchor reinforced masonry work to supporting structure as indicated.
 - 1. Anchor reinforcement masonry walls to non-reinforced masonry where they intersect.

3.2 INSTALLATION, GENERAL:

- A. Refer to section "Unit Masonry" for general installation requirements of unit masonry.
- B. Temporary Formwork: Provide formwork and shores as required for temporary support of reinforced masonry elements.
 - 1. Construct formwork to conform to shape, line and dimensions shown. Make sufficiently tight to prevent leakage of mortar, grout, or concrete (if any). Brace, tie and support as required to maintain position and shape during construction and curing of reinforced masonry.
- C. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and all other reasonable temporary loads that may be placed on them during construction.

3.3 INSTALLATION OF REINFORCED CONCRETE UNIT MASONRY:

- A. General:
 - 1. Do not wet concrete masonry units (CMU).
 - 2. Lay CMU units with full-face shell mortar beds. Fill vertical head joints (end joints between units) solidly with mortar from face of unit to a distance behind

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face equal to not less than the thickness of longitudinal face shells. Solidly bed cross-webs of starting courses in mortar. Maintain head and bed joints widths shown, or if not shown, provide 3/8 inch joints.

B. Walls:

1. Pattern Bond: Lay CMU wall units in 1/2 running bond with vertical joints in each course centered on units in courses above and below, unless otherwise indicated. Bond and interlock each course at corners and intersections. Use special-shaped units where shown, and as required of corners, jambs, sash, control joints, lintels, bond beams and other special conditions.
2. Maintain vertical continuity of core or cell cavities, which are to be reinforced and grouted, to provide minimum clear dimension indicated and to provide minimum clearance and grout coverage for vertical reinforcement bars. Keep cavities free of mortar. Solidly bed webs in mortar where adjacent to reinforced cores or cells.
3. Where horizontal reinforced beams (bond beams) are shown, use special units to allow for placement of continuous horizontal reinforcement bars. Place small mesh expanded metal lath or wire screening in mortar joints under bond beam courses over cores or cells of non-reinforced vertical cells, or provide units with solid bottoms.
4. Options: Where all vertical cores are not shown to be grouted, Contractor may elect to fill all vertical cores with grout. In which case, requirements for mortar bedding of cross-webs and closing of core spaces below bond beams do not apply.

C. Pilasters:

1. Use CMU units of the size, shape and number of vertical core spaces shown. If not shown, use units which provide minimum clearances and grout coverage for number and size of vertical reinforcement bars shown.
2. Provide pattern bond shown, or if not shown, alternate head joints in vertical alignment.
3. Where bonded pilaster construction is shown, lay wall and pilaster units together to maximum pour height specified.

D. Grouting:

1. Use concrete fill as specified in Section 03 30 00 for bond beams and reinforced CMU.
2. Grouting Technique: At the Contractor's option, use either low-lift or high-lift grouting techniques subject to requirements which follow.

E. Low-Lift Grouting:

1. Provide minimum clear dimension of 2 inches and clear area of 8 square inches in vertical cores to be grouted.
2. Place vertical reinforcement prior to laying CMU. Extend above elevation of maximum pour height as required for splicing. Support in position at vertical intervals not exceeding 192 bars diameters nor 10 feet.
3. Lay CMU to maximum pour height. Do not exceed 5 feet height, or if bond beam

- occurs below 5 feet height stop pour to course below bond beam.
4. Pour grout using chute or container with spout. Rod or vibrate grout during placing. Place grout continuously; do not interrupt pouring of grout form more than one hour. Terminate grout pours 1-1/2 inches below top course of pour.
 5. Bond Beams: Stop grout in vertical cells 1-1/2 inches below bond beam course. Place horizontal reinforcement in bond beams; lap at corners and intersections as shown. Place grout in bond beam course before filling vertical cores above bond beam.

F. High-Lift Grouting:

1. Do not use high-lift grouting technique of grouting of CMU unless minimum cavity dimension and area is 3 inches and 10 square inches respectively.
2. Provide cleanout holes in first course at all vertical cells which are to be filled with grout.
 - a. Use units, with one face shell removed and provide temporary supports for units above, or use header units with concrete brick supports, or cut openings in one face shell.
3. Construct masonry to full height of maximum grout pour specified prior to placing grout.
 - a. Limit grout lifts to a maximum height of 5 feet and grout pour to a maximum height of 24 feet, for single wythe hollow concrete masonry walls, unless otherwise indicated.
4. Place vertical reinforcement before grouting. Place before or after laying masonry units, as required by job. Tie vertical reinforcement to dowels at base of masonry where shown and thread CMU over or around reinforcement. Support vertical reinforcement at intervals not exceeding 192 bar diameters nor 10 feet.
 - a. Where individual bars are placed after laying masonry, place wire loops extending into cells as masonry is laid and loosen before mortar sets. After insertion of reinforcement bar, pull loops and bar to proper position and tie free ends.
 - b. Where reinforcement is prefabricated into cage units before placing, fabricate units with vertical reinforcement bars and lateral ties of the size and spacing indicated.
5. Place horizontal beam reinforcement as the masonry units are laid.
6. Embed lateral tie reinforcement in mortar joints where indicated. Place as masonry units are laid, at vertical spacing shown.
 - a. Where lateral ties are shown in contact with vertical reinforcement bars, embed additional lateral tie reinforcement in mortar joints. Place as shown, or if not shown, provide as required to prevent grout blowout or rupture of CMU face shells, but provide not less than No. 2 bars or 8 gage wire ties spaced 16 inches on center for members with 20: or less side dimensions, and 8 inches on center for members with side dimensions exceeding 20 inches.

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7. Preparation of Grout Spaces: Prior to grouting, inspect and clean grout spaces. Remove dust, dirt, mortar droppings, loose pieces of masonry and other foreign materials from grout spaces. Clean reinforcement and adjust to proper position. Clean top surface of structural members supporting masonry to ensure bond. After final cleaning and inspection, close cleanout holes and brace closures to resist grout pressures.
8. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist displacement of masonry units and breaking of mortar bond. Install shores and bracing, if required, before starting grouting operations.
9. Place grout by pumping into grout spaces unless alternate methods are acceptable to the Architect.
10. Limit grout pours to sections which can be completed in one working day with no more than one hour interruption of pouring operation. Place grout in lifts which do not exceed 5 feet. Allow not less than 30 minutes, nor more than one hour between lifts of a given pour. Rod or vibrate each grout lift during pouring operation.
 - a. Place grout in lintels or beams over openings in one continuous pour.
11. Where bond beam occurs more than one course below top of pour, fill bond beam course to within 1 inch of vertically reinforced cavities during construction of masonry.
12. When more than one pour is required to complete a given section of masonry, extend reinforcement beyond masonry as required for splicing. Pour grout to within 1-1/2 inches of top course of first pour. After grouted masonry is cured, lay masonry units and place reinforcement for second pour section before grouting. Repeat sequence if more pours are required.

END SECTION 04 20 30

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SECTION - 04 43 00 STONE MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This sections includes the following:

1. Dolomitic Limestone nominal panels for 2 inch nominal bed depth.

- B. Work Furnished but Installed by Others: Furnish inserts and reglets in time to be installed in concrete or masonry.

- C. Related sections:

1. Masonry Units are specified in another Division 4 section.
2. Joint sealers are specified in Division 7.

1.3 QUALITY ASSURANCE:

- A. Source Quality Control:

1. Obtain stone from quarry with consistent color range and texture throughout the work.
2. Subcontract fabrication of stone to a firm which has successfully fabricated stone similar to the quality specified for a period of not less than 5 years and is equipped to provide the quantity shown.

- B. Allowable Tolerances:

1. Variation from Plumb: For lines and surfaces of columns, walls and arises do not exceed 1/4 inch in 10 feet, 3/8 inch in a story height or 20 feet maximum, nor 1/2 inch in 40 feet or more. For external corners, expansion joints and other conspicuous lines, do not exceed 1/4 inch in any story or 20 feet maximum, nor 1/2 inch in 40 feet or more.
2. Variation from Level: For grades shown for exposed lintels, sills parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4 inch in any bay or 20 feet maximum, nor 3/4 inch in 40 feet or more.
3. Variation of Linear Building Line: For position shown in plan and related portion of columns, walls and partitions, do not exceed 1/2 inch in any bay or 20 feet maximum, nor 3/4 inch in 40 feet or more.
4. Variation in Cross-Sectional Dimensions: For columns and thickness of walls from dimensions shown, do not exceed minus 1/4 inch, nor plus 1/2 inch.

C. Job Mock Up:

1. Prior to installation of stonework, provide sample panels of stonework indicated with proposed range of color, texture and workmanship to be expected in completed work. Build mock-up at site as directed, using stone, anchors and jointing, as shown and specified in accordance with final shop drawings.
2. Obtain Architect's acceptance of visual qualities of sample panels before start of stonework. Replace unsatisfactory mock-up work as directed until acceptable to Architect. Retain sample panels during construction as a standard for judging completed stonework. Do not alter, move or destroy mock-up until work is completed.
3. If sealant primers, sealants, resin adhesives, water repellents and other compounds are required in the finished stonework, build mock-up and apply compounds in sufficient time to allow for final test for staining or other deleterious effects from such applications.

1.4 SUBMITTALS:

- A. Product Data: Submit specifications and other data for each type of stonework required, including certification that each type complies with specified requirements. Include instructions for handling, storage, installation and protection of each type.
- B. Shop Drawings:
 1. Submit cutting and setting drawings showing sizes, dimensions, sections and profiles of stonework units, arrangement and provisions for joining, anchoring and fastening, supports and other necessary details for lifting devices and reception of other work. Indicate location of each stonework unit on setting drawings with number designation corresponding to number marked on each unit.
 2. Show location of inserts (for stone anchors and supports) which are to be built into concrete or masonry.
 3. Show large scale details of decorative surfaces and inscriptions.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Protect stone during storage and construction against moisture, soiling, staining and physical damage.
- B. Handle stone to prevent chipping, breakage, soiling or other damage. Do not use pinch or wrecking bars without protecting edges of stone with wood or other rigid materials. Lift with wide belt type slings wherever possible; do not use wire rope or ropes containing tar or other substances which might cause staining. If required, use wood rollers and provide cushion at end of wood slides.
- C. Store stone on wood skids or pallets, covered with nonstaining, waterproof membrane. Place and stack skids and stones to distribute weight evenly and to prevent breakage or cracking of stones. Protect stored stone from weather with waterproof, nonstaining covers or enclosures, but allow air to circulate around stones.

- D. Protect mortar materials and stonework accessories from weather, moisture and contamination with earth and other foreign Materials.

1.6 JOB CONDITIONS:

- A. Installer must review installation procedures and coordination with other work, with Contractor and other contractors and subcontractors whose work will be affected by stonework.
- B. Protect mortar materials and stonework accessories from weather, moisture and contamination with earth and other foreign materials.
- C. Cold Weather Protection:
 - 1. Remove any ice or snow formed on stonework bed by carefully applying heat until top surface is dry to touch.
 - 2. Remove stonework determined to be frozen or damaged by freezing conditions.
 - 3. Perform the following construction procedures while work is progressing:
 - a. When air temperature is from 40 degrees F to 32 degrees F, heat sand or mixing water to produce mortar temperatures between 40 degrees F and 120 degrees F.
 - b. When air temperature is from 32 degrees F to 25 degrees F, heat sand or water to produce mortar temperatures between 40 degrees F degrees F; maintain temperature of mortar on boards above freezing.
 - c. When air temperature is from 25 degrees F, to 20 degrees F, heat sand and mixing water to produce mortar temperatures between 40 degrees F and 120 degrees F; maintain temperatures of mortar on boards above freezing; use other heat sources on both sides of walls under construction; use wind breaks when wind is in excess of 15 mph.
 - d. When air temperature is 20 degrees F and below, heat sand and mixing water to produce mortar temperatures between 40 degrees F and 120 degrees F; provide enclosures and auxiliary heat to maintain air temperature above 32 degrees F; do not lay units which have a surface temperature of 20 degrees F.
 - 4. Perform following protections for completed stonework and partially completed stonework not being worked on:
 - a. When mean daily air temperature is from 40 degrees F to 32 degrees F, protect stonework from rain or snow for at least 24 hours by covering with weather resistive membrane.
 - b. When mean daily air temperature is from 32 degrees F to 25 degrees F, completely cover stonework with weather resistive membrane for at least 24 hours
 - c. When mean daily air temperature is from 25 degrees F to 20 degrees F, completely cover stonework with insulating blankets or similar protection for at least 24 hours. When mean daily temperature is 20 degrees F and below, maintain stonework temperature above 32 degrees F for 24 hours using enclosures and supplementary heat, electric heating blankets, infrared lamps or other acceptable methods.

5. Do not use frozen materials or materials mixed or coated with ice or frost. Do not use salt to thaw ice in anchor holes or slots. Do not lower the freezing point of mortar by use of admixtures or antifreeze agents and do not use calcium chloride in mortar or grout.
6. Do not build on frozen work; remove and replace stonework damaged by frost or freezing.
7. During all seasons, protect partially completed stonework against weather when work is not in progress. Cover top of walls with strong waterproof, nonstaining membrane extending at least 2 feet down both sides of walls and anchor securely in place.

PART 2 - PRODUCTS

2.1 LIMESTONE:

- A. Provide Dolomitic limestone complying with ASTM C 568, Category II (medium density) and as follows for 1" inch nominal bed and 4 inch nominal bed:
 1. Minimum compressive strength 4000 psi per ASTM C 170 and maximum absorption 7.5 percent per ASTM C 97.
 2. 170 pounds per cubic foot.
 3. Stone variety: "Northern Buff", Vetter Stone Company, Kasota, MN.
 4. Buff color range.
 5. Standard grade (fine to moderately large-grained stone with minor color variations).
 6. Sawn top, sides, bottom and back.
 7. Hone face Finish
 8. Special shapes:
 - a. One piece corner returns.

2.2 MORTAR AND GROUT:

- A. Cement: Provide standard grey cement as follows:
 1. Portland Cement: ASTM C 150, except complying with the staining requirements of ASTM C 91 for not more than 0.03 percent water soluble alkali. Furnish Type I, except Type III may be used for setting stonework in cold weather.
- B. Hydrated Lime: ASTM C 207, Type S.
- C. Sand:
 1. ASTM C 144, except graded with 100 percent passing the No. 16 sieve for 1/4 inch and narrower joints.
- D. Additive for Moisture Resistance: Ammonium stearate, aluminum tristearate or calcium stearate.

- E. Water: Clear and free of deleterious materials which would impair the work.
- F. Flashings for Masonry:
 - 1. Provide concealed flashing, shown to be built into masonry.
 - 2. Provide concealed flashings as follows:
 - a. Stainless Steel: AISI Type 302/304, 2D finish, full annealed or dead-soft temper, 0.015 inch thick.
 - b. Provide end dams at the longitudinal ends of flashings over lintels, at column abutments and adjacent to major building expansion joints.
 - c. Flashings shall lap a minimum of 4 inches.
 - 3. Elastic Sheet Flashing/Membrane:
 - a. Manufacturer's standard flexible, elastic, black, nonreinforced, flashing sheet of 50-65 mils thickness; 50-70 Shore A hardness (ASTM D 2240); 1200 psi tensile strength (ASTM D 412); 120 lbs. per lin. in. tear resistance (ASTM D 624, Die C); ultimate elongation of 250 percent (ASTM D 412); brittleness temperature of -30 degrees F (ASTM D 746); resistance to ozone aging of no cracks for 10 percent elongated sample for 100 hours in 50 pphm ozone at 104 degrees F (ASTM D 573); resistance to heat aging of maximum hardness increase of 15 points, elongation reduction of 40 percent, and tensile strength reduction of 30 percent, for 70 hours at 212 degrees F (ASTM D 573).
 - 1) Provide neoprene synthetic rubber sheet.

2.3 STONEMASONRY ACCESSORIES:

- A. Metal Clip System: Provide metal clips designed to integrate with saw cut slots in stone panels per manufacturer's requirements.
- B. Adjustable Inserts: Malleable iron of type and size indicated or if not indicated, as required to support loading involved.
- C. Dovetail Slots: Where indicated, fabricate from not less than 24 gage galvanized steel, unless otherwise indicated. Provide with filler strips.
- D. Expansion Anchors:
 - 1. Type, size and load capacity shown or if not shown, as required to support loading involved.
 - 2. For anchoring into concrete, fabricate from cadmium-plated or hot-dipped galvanized steel.
 - 3. For anchoring into stone, fabricate from AISI Type 302/304 stainless steel.
- E. Anchor Bolts, Nuts and Washers: Fabricate from AISI Type 302/204 stainless steel if in contact with stone; otherwise provide regular low carbon steel bolts and nuts (ASTM A 307) hot-dip galvanized, complying with ASTM A 153.

- F. Setting Buttons: Lead or plastic buttons of the thickness required for the joint size indicated and of the size required to maintain uniform joint width.
- G. Drainage Board and Weeps: Masonry Technology, Inc. Product line to include: "Sure Cavity", "Control Cavity" and "Vent mat."
- H. Weephole / Ventilators: One piece units made to fit in a vertical mortar joint from polyvinyl chloride in custom color approved by Architect to match mortar. Space at 24 inches on center at elevations shown. Williams Products, Inc., "Williams - Goodco Brick Vent" or Architect approved equal.

2.4 MIXES:

- A. Mortar: Nonstaining, cement/lime mortar, complying with ASTM C 270, Type S, using specified materials.
 - 1. Use specified mortar for grouting.

2.5 FABRICATION:

- A. General: Fabricate as shown and as detailed on final shop drawings and in compliance with recommendations of applicable stone association. Provide holes and sinkages cut or drilled for anchors, fasteners, supports and lifting devices, as shown and as necessary to secure stonework in place. Cut and back-check as required for proper fit and clearance. Shape beds to fit supports.
- B. Contiguous Work: Provide chases, reveals, reglets, openings and similar spaces and features as required for contiguous work. Coordinate with drawings and final shop drawings showing contiguous work.
- C. Cut accurately to shape and dimensions shown on final shop drawings, maintaining fabrication tolerances of applicable stone associations.
 - 1. Dress joints (bed and vertical) straight and at a 90 degree angle to face, unless otherwise indicated.
 - 2. Joint Width: Cut to provide joint widths as indicated or, if not indicated, cut to allow for uniform 1/4 inch wide joints.
- D. Thickness: Provide stone of thickness indicated. Saw cut back surfaces which will be concealed in finished work. Allow not less than 1 inch clearance between back face of units and structure framing (or fireproofing, if any).

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Installer must examine supporting structure and conditions under which the stonework is to be installed and notify Contractor in writing of any conditions detrimental to proper

and timely completion of work. Do not proceed with the installation of stonework until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

- B. Do not use stone units with chips, cracks, voids, stains or other defects which might be visible in the finished work unless otherwise acceptable to the Architect.
- C. Do not build on frozen work; remove and replace stonework damaged by frost or freezing.
- D. Do not use frozen materials or materials mixed or coated with ice or frost. Do not use salt to thaw ice in anchor holes or slots. Do not lower freezing point of mortar by use of admixtures or antifreeze agents and do not use calcium chloride in mortar or grout.

3.2 PREPARATION:

- A. Advise Installers of other work about specific requirements relating to his placement of inserts and flashing reglets which are to be used by stone mason for anchoring and supporting and flashing of stonework. Furnish Installers of other work with drawings or templates showing location of inserts for stone anchors and supports.
- B. Clean stone before setting by thoroughly scrubbing with fiber brushes followed by a thorough drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh fillers or abrasives. If not thoroughly wet at time of setting, drench or sponge stone. Do not wet expansion or control joint surfaces.

3.3 INSTALLATION:

- A. Execute stonework by skilled mechanics, and employ skilled stone fitters at the site to do necessary field cutting as stone is set.
- B. Contiguous Work: Provide chases, reveals, reglets, openings and other spaces as shown or required for contiguous work. Close-up openings in stonework after other work is in place. Use materials and set to match surrounding stonework.
- C. Ferrous Metal: Where stonework will contact ferrous metal surfaces which will be concealed in back-up construction (anchors, supports, structural framing and similar surfaces), apply a heavy coat of bituminous paint on metal surfaces prior to setting of stone. Do not extend coating onto portions of ferrous metal which will be exposed in finished work. Do not apply coating to stainless or nonferrous metals.
- D. Provide expansion joints where shown. Do not fill with mortar. Install continuous strips of preformed joint filler to allow for installation of backer rod and sealant, specified in Division 7.
- E. Set stone in accordance with drawings and final shop drawings for stonework. Provide anchors, supports, fasteners, drainage mat and metal lathing at thin veneer and other attachments shown or necessary to secure stonework in place. Shim and adjust accessories for proper setting of stone. Completely fill holes, slots and other sinkages for anchors, dowels, fasteners and supports with mortar during setting of stones.

F. Walls: Erect walls plumb and true with joints uniform in width and accurately aligned. Set in full bed of mortar, unless otherwise indicated. Provide setting buttons as required to prevent extrusion of mortar. Do not set units above until mortar in courses below is set sufficiently to maintain alignment and prevent extrusion.

1. Cavity Construction:

- a. Where open space between back of stone units and back-up or framing is shown, keep cavity open; do not fill with mortar or grout.
- b. Back paint stone wall units with nonstaining, asphalt emulsion dampproofing or cement base masonry dampproofing compound. Wherever possible, apply compound to back of stone units and joints after setting.

2. Joints:

- a. Butter vertical joints for full width before setting and set units in full bed of mortar, unless otherwise indicated. Point joints after setting by tooling to profile shown or, if not shown, tool slightly concave.
- b. Rake out joints 3/4 inch deep before mortar sets to allow for mortar pointing. Clean face of stone after raking. After mortar is set, wet raked joints thoroughly and force pointing mortar into joints. Tool to profile shown or, if not shown, tool slightly concave. Provide pointing mortar using specified materials to match Architect's sample.

G. Provide stone veneer ties to wall substrate at centers indicated, and if not indicated at a minimum of 24 inches on center vertically, and 48 inches on center horizontally.

H. Strike joints to a slight concave radius and sufficiently compress mortar.

3.4 ADJUST AND CLEAN:

- A. Remove and replace stone units which are broken, chipped, stained or otherwise damaged. Where directed, remove and replace units which do not match adjoining stonework. Provide new matching units, install as specified and point up joints to eliminate evidence of replacement. Repoint defective and unsatisfactory joints as required to provide a neat, uniform appearance.
- B. Clean stonework not less than 6 days after completion of work using clean water and stiff bristle brushes. Do not use wire brushes, acid type cleaning agents or other cleaning compounds with caustic or harsh fillers.
- C. Installer shall advise Contractor of proper procedures required to protect the stonework from collapse, deteriorations, discoloration or damage during subsequent construction and until acceptance of the work.

END SECTION 04 43 00

SECTION 05 12 00 - STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes the following:

1. Extent of structural steel work is shown on drawings including schedules, notes and details to show size and location of members, typical connections and type of steel required.
2. Structural steel is that work defined in AISC "Code of Standard Practice" and as otherwise shown on drawings.

- B. Related Sections:

1. Miscellaneous Metal Fabrications are specified elsewhere in Division 5.

1.3 QUALITY ASSURANCE:

- A. Codes and Standards: Comply with provisions of following, except as otherwise indicated:

1. AISC "Code of Standard Practice for Steel Buildings and Bridges."
2. AISC "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings," including the "Commentary" and Supplements thereto as issued.
3. AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts" approved by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation.
4. AWS D1.1 "Structural Welding Code."
5. ASTM A 6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use."

- B. Qualifications for Welding Work:

1. Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure."
2. Provide certification that welders to be employed in work have satisfactorily passed AWS qualification tests within previous 12 months. If recertification of welders is required, retesting will be Contractor's responsibility.

1.4 SUBMITTALS:

- A. Product Data: If requested, submit producer's or manufacturer's specifications and installation instructions for following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).
 - 1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties.
 - 2. High-strength bolts (each type), including nuts and washers.
 - 3. Structural steel primer paint.
 - 4. Shrinkage resistant grout.

- B. Shop Drawings:
 - 1. Submit shop drawings prepared under supervision of a registered professional engineer, including complete details and schedules for fabrication and assembly of structural steel members procedures and diagrams.
 - 2. Include details of cuts, connections, camber, holes and other pertinent data. Indicate welds by standard AWS symbols and show size, length and type of each weld.
 - 3. Provide setting drawings, templates and directions for installation of anchor bolts and other anchorages to be installed by others.

- C. The Testing Agency shall submit three copies of Field Quality Control test results. One copy shall be sent to the Contractor and two copies shall be sent directly to the Architect from the Testing Agency.

1.5 DELIVERY, STORAGE AND HANDLING:

- A. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete or masonry, in ample time to not delay that work.

- B. Store materials to permit easy access for inspection and identification. Keep steel members off the ground using pallets, platforms or other supports. Protect steel members and packaged materials from erosion and deterioration.

- C. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures as directed.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Metal Surfaces, General: For fabrication of work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness. Remove such blemishes by grinding or by welding and grinding, prior to cleaning, treating and application of surface finishes.

- B. Rolled Wide-Flange Steel Shapes: ASTM A 992, with $F_y = 50$ ksi minimum

- C. Other Structural Steel Shapes, Plates and Bars: ASTM A 36, except where other type

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steel is indicated.

- D. Cold-Formed Steel Tubing (HSS – square, rectangular and round): ASTM A 500, Grade B, with $F_y = 46$ ksi minimum.
- D. Hot-Formed Steel Tubing: ASTM A 501.
- E. Steel Pipe: ASTM A 53, Type E or S, Grade B.
 - 1. Finish: Black, except where indicated to be galvanized.
- F. Anchor Bolts: ASTM F 1554, nonheaded type unless otherwise indicated.
- G. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular low carbon steel bolts and nuts. Provide either hexagonal or square, heads and nuts, except use only hexagonal units for exposed connections.
- H. High Strength Threaded Fasteners: Heavy hexagon structural bolts, heavy hexagon nuts and hardened washers, as follows:
 - 1. Quenched and tempered medium carbon steel bolts, nuts and washers, complying with ASTM A 325. For high strength low alloy steel, provide Type 3 fasteners of similar composition as members to be connected.
 - 2. Direct tension indicating (“twist-off”) bolts, as manufactured by Lejeune, Nucor or equal and conforming to the above, are acceptable.
 - 3. Quenched and tempered alloy steel bolts, nuts and washers, complying with ASTM A 490.
- I. Electrodes for Welding: Comply with AWS Code. For high strength low alloy steel, provide electrodes, welding rods and filler metals equal in strength and compatible in appearance with parent metal joined.
- J. Stud Anchors
Headed studs for embedment in concrete or masonry shall be manufactured from cold-drawn bar stock conforming to ASTM A-108, as manufactured by TRW, Nelson Division.
- K. Structural Steel Primer Paint: Equal to Tnemec, Series 88HS, except for architecturally exposed to exterior, use one shop coat equal to Tnemec 90-97, Zinc-rich Urethane.
- L. Nonmetallic Shrinkage Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining product containing selected silica sands, portland cement, shrinkage compensating agents, plasticizing and water reducing agents, complying with CRD-C588, Type A.
 - 1. Products offered by manufacturers to comply with requirements for nonmetallic, nonshrink grout include following:
 - a. Euco N.S.; Euclid Chemical Company
 - b. Crystex; L&M Construction Chemicals
 - c. Masterflow 713; Master Builders

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- d. Five Star Grout; U.S. Grout Corp.
- e. Upcon; Upco Chem. Div., USM Corp.
- f. Propak; Protex Industries, Inc.

2.2 FABRICATION:

- A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings. Provide camber in structural members where indicated.
- B. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence, which will expedite erection and minimize field handling of materials.
- C. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs and other defects.
- D. Connections:
 - 1. Weld or bolt shop connections, as indicated.
 - 2. Bolt field connections, except where welded connections or other connections are indicated.
 - 3. Provide high strength threaded fasteners for principal bolted connections, except where unfinished bolts are indicated.
 - 4. Provide unfinished threaded fasteners for only bolted connections of secondary framing members to primary members (including purlins, girts and other framing members taking only nominal stresses) and for temporary bracing to facilitate erection.
- E. High Strength Bolted Construction: Install high strength threaded fasteners in accordance with AISC "Specifications for Structural Joints using ASTM A 325 or A 490 Bolts." (RCRBSJ).
- F. Welded Construction:
 - 1. Comply with AWS Code for procedures, appearance and quality of welds and methods used in correcting welding work.
 - 2. Assemble and weld built-up sections by methods which will produce true alignment of axis without warp.
 - 3. For high strength low alloy steels, follow welding procedures as recommended by steel producer for exposed and concealed connections.
- G. Holes for Other Work:
 - 1. Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members, as shown on final shop drawings.
 - 2. Provide threaded nuts welded to framing and other specialty items as indicated to receive other work.
 - 3. Cut, drill or punch holes perpendicular to metal surfaces. Do not flame cut holes

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or enlarge holes by burning. Drill holes in bearing plates.

2.3 SHOP PAINTING:

- A. General: Shop paint structural steel, except those members or portions of members to be embedded in concrete or mortar. Paint embedded steel, which is partially exposed on exposed portions, and initial 2 inches of embedded areas only.
 - 1. Do not paint surfaces which are to be welded or high strength bolted with friction type connections.
 - 2. Do not paint surface which are scheduled to receive sprayed-on fireproofing.
 - 3. Do not paint surfaces of exposed high strength low alloy steel members.
 - 4. Apply 2 coats of paint to surfaces which are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.
- B. Surface Preparation: After inspection and before shipping, clean steelwork to be painted. Remove loose rust, loose mill scale and spatter, slag or flux deposits. Clean steel in accordance with Steel Structures Painting Council as follows:
 - 1. SSPC – SP1 "Solvent Cleaning."
 - 2. SSPC – SP2 "Hand Tool Cleaning."
 - 3. SSPC – SP3 "Power Tool Cleaning."
 - 4. SSPC – SP6 "Commercial Blast Cleaning."
- C. Painting: Immediately after surface preparation apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide a minimum uniform dry film thickness of 2.0 mils. Use painting methods which result in full coverage of joints, corners, edges and exposed surfaces.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Erector must examine areas and conditions under which structural steel work is to be installed and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the Erector.

3.2 ERECTION:

- A. Surveys: Establish permanent bench marks as shown and as necessary for accurate erection of structural steel. Check elevations of concrete and masonry bearing surfaces and locations of anchor bolts and similar devices before erection work proceeds and report discrepancies to Architect. Do not proceed with erection until corrections have been made or until compensating adjustments to structural steel work have been agreed upon with Architect.
- B. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. Remove temporary members and connections when permanent members are in place and final connections are made.

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Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.

- C. Temporary Planking: Provide temporary planking and working platforms as necessary to effectively complete work.
- D. Anchor Bolts: Furnish anchor bolts and other connectors required for securing structural steel to foundations and other in-place work. Furnish templates and other devices as necessary for presetting bolts and other anchors to accurate locations.
- E. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates. Set loose and attached base plates and bearing plates for structural members on wedges or other adjusting devices.
- F. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims but if protruding, cut off flush with edge of base or bearing plate prior to packing with grout.
- G. Pack grout solidly between bearing surfaces and bases or plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials and allow to cure.
- H. Field Assembly:
 - 1. Set structural frames accurately to lines and elevations indicated. Align and adjust various members forming a part of a complete frame or structure before permanently fastening. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 2. Level and plumb individual members of structure within specified AISC tolerances.
 - 3. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be when completed and in service.
 - 4. Splice members only where indicated and accepted on shop drawings.
- I. Erection Bolts: On exposed welded construction, remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces.
- J. Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment and removal of paint on surfaces adjacent to field welds.
- K. Do not enlarge unfair holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
- L. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in structural framing. Cutting will be permitted only on secondary members which are not under stress, as acceptable to Architect. Finish gas cut sections equal to a sheared appearance when permitted.

- M. Stud Connector Welding:
 - 1. Remove any paint on surfaces to receive studs.
 - 2. Use ONLY automatically timed stud welding equipment, as manufactured by TRW, Nelson Division, following all manufacturer's recommendations.
 - 3. Adjust equipment on trial studs as necessary until sound anchorages are obtained.
- N. Hand operated shielded metal arc welding of studs will NOT be permitted.
- O. Touch Up Painting: Immediately after erection clean field welds, bolted connections and abraded areas of shop paint. Apply paint to exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

3.3 FIELD QUALITY CONTROL:

- A. The Owner will engage an independent testing and inspection agency to inspect high strength bolted connections and welded connections and to perform tests and prepare test reports.
- A. Testing agency shall conduct and interpret tests and state in each report whether test specimens comply with requirements and specifically state any deviations therefrom.
- B. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.
- C. Testing agency may inspect structural steel at plant before shipment; however, Architect reserves right, at any time before final acceptance, to reject material not complying with specified requirements.
- D. Correct deficiencies in structural steel work which inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests, at Contractor's expense, as may be necessary to reconfirm any noncompliance of original work and as may be necessary to show compliance of corrected work.
- E. Shop Bolted Connections: Inspect in accordance with AISC specifications.
- F. Shop Welding: Inspect and test during fabrication of structural steel assemblies, as follows:
 - 1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 - 2. Perform visual inspection of all welds.
 - 3. Perform tests of all full penetration welds and visually suspect welds, as required. Inspection procedures listed are to be used at the discretion of the testing agency.
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 109; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration not acceptable.

- c. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T".
 - d. Ultrasonic Inspection: ASTM E 164.
- G. Field Welding: Inspect and test during erection of structural steel as follows:
- 1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in work. Record work required and performed to correct deficiencies.
 - 2. Perform visual inspection of all welds.
 - 3. Perform tests of all full penetration welds and visually suspect welds, as required. Inspection procedures listed are to be used at the discretion of the testing agency.
 - a. Liquid Penetrant Inspection: ASTM E 165.
 - b. Magnetic Particle Inspection: ASTM E 109; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration not acceptable.
 - c. Radiographic Inspection: ASTM E 94 and ASTM E 142; minimum quality level "2-2T".
 - d. Ultrasonic Inspection: ASTM E 164.

END SECTION 05 12 00

SECTION 05 20 00 - METAL JOISTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. Extent of steel joists is shown on drawings including basic layout and type of joists required.

1.3 QUALITY ASSURANCE:

- A. Provide joists fabricated in compliance with the following and as herein specified:
 - 1. SJI "Standard Specifications, Load Tables and Weight Tables" for:
 - a. K-Series Open Web Steel Joists
- B. Qualification of Field Welding: Qualify welding processes and welding operators in accordance with the AWS "Standard Qualification Procedure."
- C. Joists welded in place are subject to inspection and testing. Expense of removing and replacing any portion of steel joists for testing purposes will be born by Owner if welds are found to be satisfactory. Remove and replace work found to be defective and provide new acceptable work.
- D. Fabrication and erection shall comply with the Occupational Safety and Health Administration (OSHA) standards for the Construction Industry, including 2001 requirements of 29 CFR 1926 Part R Safety Standards for Steel Erection.

1.4 JOIST DESIGN:

- A. Design all joists for a maximum live load deflection of $L/360$.
- B. Design joists for the loading conditions shown on the drawings where joists are labeled "special."
- C. Design bridging for roof joists for a net uplift of 12 psf.

1.5 SUBMITTALS:

- A. Product Data: Submit manufacturer's specifications and installation instructions for each type of joist and accessories. Include manufacturer's certification that joists comply with

SJI "Specifications."

- B. Shop Drawings: Submit detailed drawings showing layout of joist units, special connections, jointing and accessories. Include mark, number, type, location and spacing of joists and bridging.
- C. Provide templates or location drawings for installation of anchor bolts.
- D. Provide manufacturer's design calculations prepared, sealed, signed, and dated by a Wisconsin registered Professional Engineer for all joists requiring special design and designated as "SP".

1.6 DELIVERY, STORAGE AND HANDLING:

- A. Deliver, store and handle steel joists as recommended in SJI "Specification." Handle and store joists in a manner to avoid deforming members and to avoid excessive stresses.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Steel: Comply with SJI "Specifications."
- B. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular hexagon type, low carbon steel.
- B. High Strength Threaded Fasteners: ASTM A 325 or A 490 heavy hexagon structural bolts with nuts and hardened washers.
- C. Steel Prime Paint: Comply with SJI "Specifications," except asphalt type paint not permitted.

2.2 FABRICATION:

- A. General: Fabricate steel joists in accordance with SJI "Specification."
- B. Holes in Chord Members: Provide holes in chord members where shown for securing other work to steel joists; however, deduct area of holes from the area of chord when calculating strength of member.
- C. Extended Ends: Provide extended ends on joists where shown, complying with manufacturer's standards and requirements of applicable SJI "Specifications" and load tables.
- D. Ceiling Extensions: Provide ceiling extensions in areas having ceiling attached directly to joist bottom chord. Provide either an extended bottom chord element or a separate unit, to suit manufacturer's standards, of sufficient strength to support ceiling construction. Extend ends to within 1/2 inch of finished wall surface unless otherwise indicated.

- E. Bridging:
 - 1. Provide horizontal or diagonal type bridging for "open web" joists, complying with SJI "Specifications."
 - 2. Provide diagonal type bridging for "longspan" joists, complying with SJI "Specifications."
 - 3. Provide bridging anchors for ends of bridging lines terminating at walls or beams.
- F. End Anchorage: Provide end anchorages to secure joists to adjacent construction, complying with SJI "Specifications," unless otherwise indicated.
- G. Shop Painting: Remove loose scale, heavy rust and other foreign materials from fabricated joists and accessories before application of shop paint. Apply one shop coat of primer paint to steel joists and accessories by spray, dipping or other method to provide a continuous dry paint film thickness of not less than 1.0 mil.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Erector must examine areas and conditions under which steel joists are to be installed and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Erector.

3.2 ERECTION:

- A. Place and secure steel joists in accordance with SJI "Specifications," final shop drawings and as herein specified.
- B. Anchors: Furnish anchor bolts and other devices to be built into concrete and masonry construction. Furnish templates for accurate location of anchors in other work.
 - 1. Furnish unfinished threaded fasteners for anchor bolts, unless otherwise indicated.
 - 2. Refer to Division 3 sections for installation of anchors set in concrete.
 - 3. Refer to Division 4 sections for installation of anchors set in masonry.
- C. Placing Joists: Do not start placement of steel joists until supporting work is in place and secured. Place joists on supporting work, adjust and align in accurate locations and spacing before permanently fastening.
 - 1. Provide temporary bridging, connections and anchors to ensure lateral stability during construction.
 - 2. Where "open web" joist lengths are 40 foot and longer, install a center row of bolted bridging to provide lateral stability before slackening of hoisting lines.
- D. Bridging: Install bridging simultaneously with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords where terminating at

walls or beams.

E. Fastening Joists:

1. Field weld joists to supporting steel framework in accordance with SJI "Specifications" for type of joists used. Coordinate welding sequence and procedure with placing of joists.
2. Secure joists resting on masonry or concrete bearing surfaces by bedding in mortar and anchoring to masonry or concrete construction as specified in SJI "Specifications" for type of steel joist used.
3. Bolt joists to supporting steel framework in accordance with SJI "Specifications" for type of joists used.
4. Provide unfinished threaded fasteners for bolted connections except where high strength bolts or welded connections are shown or required by SJI practice.

F. Touch Up Painting: After joist installation paint field bolt heads and nuts and welded areas, abraded or rusty surfaces on joists and steel supporting members. Wire brush surfaces and clean with solvent before painting. Use same type of paint as used for shop painting applied to achieve a minimum dry film thickness of 1.0 mil.

END SECTION 05 20 00

SECTION 05 30 00 - METAL DECKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. The extent of metal decking is shown on the drawings, including basic layout and type of deck units required.

1.3 QUALITY ASSURANCE:

- A. Codes and Standards: Comply with provisions of the following codes and standards, except as otherwise shown or specified:
 - 1. AISI "Specification for the Design of Cold-Formed Steel Structural Members".
 - 2. AWS "Structural Welding Code".
 - 3. SDI "Design Manual for Floor Decks and Roof Decks".
- B. Qualification of Field Welding: Qualify welding processes and welding operators in accordance with AWS "Standard Qualification Procedure".

1.4 PERFORMANCE REQUIREMENTS:

- A. Uplift Loading: Install and anchor roof deck units to resist gross uplift loading of 45 pounds per square feet at eave overhang and 30 pounds per square feet for other roof areas.

1.5 SUBMITTALS:

- A. Product Data: Submit manufacturer's specifications and installation instructions for each type of decking and accessories. Include manufacturer's certification as may be required to show compliance with these specifications.
- B. Shop Drawings: Submit detailed drawings showing layout and types of deck panels, anchorage details, and conditions requiring closure panels, supplementary framing, sump pans, cant strips, cut openings, special jointing or other accessories.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Steel for Painted Metal Deck Units: ASTM A 611, Grade C.

- B. Acoustical Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 31, and with the following:
1. Prime-Painted Steel Sheet: ASTM A 1008/A 1008M, Structural Steel (SS), Grade 33 minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer.
 - a. Color: Gray top surface with white underside.
 2. Deck Profile: Type WR, wide rib.
 3. Profile Depth: As indicated.
 4. Design Uncoated-Steel Thickness: As indicated.
 5. Span Condition: As indicated.
 6. Side Laps: Overlapped or interlocking seam at Contractor's option.
 7. Acoustical Perforations: Deck units with manufacturer's standard perforated vertical webs.
 8. Sound-Absorbing Insulation: Manufacturer's standard premolded roll or strip of glass or mineral fiber. Profile to fill deck flutes level to top plan of deck.
 9. Acoustical Performance: NRC 0.65, tested according to ASTM C 423.
- C. Miscellaneous Steel Shapes: ASTM A 36.
- D. Sheet Metal Accessories: ASTM A 526, commercial quality, galvanized.
- E. Paint: Manufacturer's baked-on, rust-inhibitive paint, for application to metal surfaces which have been chemically cleaned and phosphate chemical treated.
- F. Flexible Closure Strips: Manufacturer's standard vulcanized, closed-cell, synthetic rubber.
- G. Powder-actuated Fasteners: Fasteners, appropriately sized for substrate thickness, equal to Hilti, for installation with the DX 750 system.

2.2 FABRICATION:

- A. General: Form deck units in lengths to span 3 or more supports, with flush, telescoped or nested 2 inch laps at ends and interlocking or nested side laps, unless otherwise indicated.
- B. Roof Deck Units: Provide deck configurations complying with SDI "Roof Deck Specifications", of metal thickness, depth and width as shown.
- C. Metal Cover Plates: Fabricate metal cover plates for end-abutting floor deck units of not less than same thickness as decking. Form to match contour of deck units and approximately 6 inches wide.
- D. Metal Closure Strips: Fabricate metal closure strips, for cell raceways and openings between decking and other construction, of not less than 0.045 inch min. (18 gage) sheet steel. Form to provide tight-fitting closures at open ends of cells or flutes and sides of decking.

- E. Roof Sump Pans: Fabricate from single piece of 0.071 inch minimum (14 gage) galvanized sheet steel with level bottoms and sloping sides to direct water flow to drain, unless otherwise shown. Provide sump pans of adequate size to receive roof drains and with bearing flanges not less than 3 inches wide. Recess pans not less than 1-1/2 inches below roof deck surface, unless otherwise shown or required by deck configuration. Holes for drains will be cut in the field.
- F. Cant Strips: Fabricate cant strips of 0.028 inch minimum (22 gage) galvanized sheet steel. Bend to form a 45 degree cant not less than 5 inches wide, with top and bottom flanges not less than 2 inches wide, unless otherwise shown.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Installer must examine areas and conditions under which metal decking is to be installed and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.2 INSTALLATION:

A. General:

1. Install deck units and accessories in accordance with manufacturer's recommendations and final shop drawings, and as specified herein.
2. Place deck units on supporting steel framework and adjust to final position with ends accurately aligned and bearing on supporting members before being permanently fastened. Do not stretch or contract side lap interlocks.
3. Place deck units flat and square, secured to adjacent framing without warp or excessive deflection.
4. Do not place deck units on concrete supporting structure until concrete has cured and is dry.
5. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.

B. Fastening Deck Units:

1. Fasten roof deck units to steel supporting members by not less than 5/8 inch diameter fusion welds or elongated welds of equal strength, spaced not more than 6 inches on center at end laps and at 12" at intermediate supports. See drawings for closer spacing where required for lateral force resistance.
2. Roof deck may be attached using Powder-actuated fasteners at similar spacings to those noted in 3 above.
3. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work. Use welding washers where recommended by deck manufacturer.
4. Lock side laps of adjacent deck units between supports, at intervals not exceeding 36 inches on center. Keep the interiors of cells that will be used as raceways free of welds having sharp points or edges.

5. Cutting and Fitting: Cut and neatly fit deck units and accessories around other work projecting through or adjacent to the decking, as shown.
 6. Reinforcement at Openings: Provide additional metal reinforcement and closure pieces as required for strength, continuity of decking and support of other work shown.
- C. Joint Covers: Provide metal joint covers at abutting ends and changes in direction of floor deck units, except where taped joints are required.
- D. Roof Sump Pans: Place over openings provided in roof decking and weld to top decking surface. Space welds not more than 12 inches on center with at least one weld at each corner. Cut opening in roof sump bottom to accommodate drain size indicated.
- E. Cant Strips: Weld to top surface of roof decking, and secure to wood nailers with galvanized nails, and to steel framing with welds or galvanized self-tapping screws. Space fasteners or welds at 12 inches on center. Lap end joints not less than 3 inches, and secure with galvanized sheet metal screws.
- F. Closure Strips:
1. Provide metal closure strips at open uncovered ends and edges of roof decking, and in voids between decking and other construction. Weld into position to provide a complete decking installation.
 2. Provide flexible closure strips instead of metal closures, at Contractor's option, wherever their use will ensure complete closure. Install with adhesive in accordance with manufacturer's instructions.
- G. Touch Up Painting:
1. After decking installation, wire brush, clean and paint scarred areas, welds and rust spots on top and bottom surfaces of decking units and supporting steel members.
 2. Touch up painted surfaces with same type of shop paint used on adjacent surfaces.
 3. In areas where shop painted surfaces are to be exposed, apply touch up paint to blend into adjacent surfaces.

END SECTION 05 30 00

SECTION 05 40 00 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. Extent of light gage framing is shown on drawings.
- B. Types of light gage metal framing units include the following:
 - 1. Load-bearing punched channel studs.
 - 2. "C" shaped steel studs.
 - 3. "C" shaped steel joists.

1.3 QUALITY ASSURANCE:

- A. Component Design: Compute structural properties of studs and joists in accordance with AISI "Specification for Design of Cold-Formed Steel Structural Members" and Center for Cold-Formed Steel Structures (CCFSS) Technical Bulletin, Vol. 2, No. 1, February 1993 "AISI Specification Provisions for Screw Connections".
- B. Submit structural design with supporting calculations stamped by a Registered Professional Engineer in the State of Wisconsin for approval by Engineer.
- C. Complete design calculations for systems shall include design dead, live, and wind and seismic loads using load criteria as indicated on Drawings. Wind load design shall utilize components and cladding positive and negative wind loads per the 2009 IBC with Wisconsin Amendments. Include engineering analysis depicting stress and deflection requirements. Include design for connections and attachment to structure. Conform to 2009 IBC with Wisconsin Amendments and AISI Code for cold-formed materials.
- D. Limit maximum simple span vertical deflection of floor joist framing to L/480 for live loads and L/360 for total loads. Limit maximum simple span vertical deflection of roof joist framing to L/360 for live loads and L/240 for total loads.
- E. Limit maximum simple span lateral deflection of studs supporting masonry veneer to L/600 with the stud backup system alone taking lateral load. No composite action with sheathing or brick permitted. Limit spandrel panel cantilever projection deflection to L/360 at window head and sill. Limit vertical stud deflection to 1/8 inch at window head. Limit maximum simple span lateral deflection of studs supporting metal panels only to L/360. The 0.7 factor, as noted in the 2009 IBC with Wisconsin Amendments Table 1604.3, shall not be permitted to be used for meeting deflection criteria as set forth in this Specification.

- F. Design framing systems to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of 1 inch, plus or minus, of primary building structure.
- G. Studs listed on drawings are minimum sizes and are to be used only as an aid in bidding. Stud depths shown on drawings are to be used, however flange widths of all cold-formed metal framing shall be determined by the cold-formed framing designer. Stud spacings shall be as determined by the cold-formed framing designer with a maximum permitted spacing of 16" oc unless noted otherwise on drawing.
- H. Headers and jambs at openings may consist of built-up cold-formed metal sections or hot rolled steel sections (tubes, angles, etc.) as determined by the cold-formed framing designer. Some conditions may necessitate hot-rolled steel sections, and are to be supplied and installed by the cold-formed metal contractor.
- I. Welding: Use qualified welders and comply with the American Welding Society (AWS) D1.3, "Structural Welding Code Sheet Steel." Welders shall be currently certified in the State of Wisconsin, in accordance with Section 6.0 "Inspection" of AWS D1.3. and per the stipulations of the Wisconsin Department of Commerce.
- J. Manufacturers offering products complying with requirements for light gage metal framing components include the following:
 - 1. Punched channel load-bearing studs, 1-3/8 inch flange:
 - a. Clark/Dietrich Building Systems
 - b. Marino/WARE
 - 2. "C"-shaped load bearing studs, 1-5/8 inch flange:
 - a. Clark/Dietrich Building Systems
 - b. Marino/WARE
 - 3. "C"-shaped steel joists:
 - a. Clark/Dietrich Building Systems
 - b. Marino/WARE

1.4 SUBMITTALS:

- A. Product Data: Submit manufacturer's product information and installation instructions for each item of light gage framing and accessories.
- B. Shop Drawings:
 - 1. Submit shop drawings for special components and installations not fully dimensioned or detailed in manufacturer's product data.
 - 2. Include placing drawings for framing members showing size and gage designations, number, type, location and spacing. Indicate supplemental strapping, bracing, splices, accessories, and details required for proper

installation.

- C. Provide manufacturer's design calculations prepared, sealed, signed, and dated by a Wisconsin registered Professional Engineer.

1.5 DELIVERY AND STORAGE:

- A. Protect metal framing units from rusting and damage. Deliver to project site in manufacturer's unopened containers or bundles, fully identified with name, brand, type and grade. Store off ground in a dry ventilated space or protect with suitable waterproof coverings.

PART 2 - PRODUCTS

2.1 METAL FRAMING:

- A. System Components: With each type of metal framing required, provide manufacturer's standard steel runners (tracks), blocking, lintels, clip angles, shoes, reinforcements, fasteners, and accessories as recommended by manufacturer for applications indicated, as needed to provide a complete metal framing system.
- B. Materials and Finishes:
 - 1. For 16 gage and heavier units, fabricate metal framing components of structural quality steel sheet with a minimum yield point of 40,000 psi; ASTM A 653.
 - 2. For 18 gage and lighter units, fabricate metal framing components of commercial quality steel sheet with a minimum yield point of 33,000 psi; ASTM A 653.
 - 3. Provide galvanized finish to metal framing components complying with ASTM A 653 for minimum G 90 coating.
- C. "C" Shape Studs: Manufacturer's standard load-bearing steel studs of size, shape, and gage indicated, with 1.625 inches flange and flange return lip.
- D. Punched Channel Studs: Manufacturer's standard, factory punched, load-bearing steel studs of size, shape, and gage indicated, with 1.375 inches flange.
- E. Joists: Manufacturer's standard C shape sections of size, shape and gage indicated.

2.2 FABRICATION:

- A. General: Framing components may be prefabricated into panels prior to erection. Fabricate panels plumb, square, true to line and braced against racking with joints welded. Perform lifting of prefabricated panels in a manner to prevent damage or distortion.
- B. Fastenings:
 - 1. Attach similar components by welding. Attach dissimilar components by

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welding, bolting, or screw fasteners, as standard with manufacturer.

2. Wire tying of framing components is not permitted.

PART 3 - EXECUTION

3.1 INSPECTION AND PREPARATION:

- A. Preinstallation Conference: Prior to start of installation of metal framing systems, meet at project site with installers of other work including door and window frames and mechanical and electrical work. Review areas of potential interference and conflicts, and coordinate layout and support provisions for interfacing work.

3.2 INSTALLATION:

- A. Manufacturer's Instructions: Install metal framing systems in accordance with manufacturer's printed or written instructions and recommendations, unless otherwise indicated.
- B. Runner Tracks: Install continuous tracks sized to match studs. Align tracks accurately to layout at base and tops of studs. Secure tracks as recommended by stud manufacturer for type of construction involved, except do not exceed 24 inches on center spacing for nail or power-driven fasteners, nor 16 inches on center for other types of attachment. Provide fasteners at corners and ends of tracks.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Where stud system abuts structural columns or walls, including masonry walls, anchor ends of stiffeners to supporting structure.
- E. Install supplementary framing, blocking and bracing in metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim and furnishings, and similar work requiring attachment to the wall or partition. Where type of supplementary support is not otherwise indicated, comply with stud manufacturer's recommendations and industry standards in each case, considering weight or loading resulting from item supported.
- F. Installation of Wall Stud System: Secure studs to top and bottom runner tracks by either welding or screw fastening at both inside and outside flanges.
- G. Frame wall openings larger than 2 feet-0 inches square with double stud at each jamb of frame except where more than 2 are either shown or indicated in manufacturer's instructions. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with stud shoes or by welding, and space jack studs same as full-height studs of wall. Secure stud system wall opening frame in manner indicated.
- H. Frame both sides of expansion and control joints, as shown for wall system, with a separate stud and do not bridge the joint with components of stud system.
- I. Install horizontal stiffeners in stud system, space (vertical distance) at not more than 4

feet-6 inches on center. Weld at each intersection.

J. Installation of Joists:

1. Install level and plumb, complete with bracing and reinforcing as indicated on drawings. Provide not less than 1-1/2 inches end bearing.
2. Reinforce ends with end clips, steel hangers, steel angle clips, steel stud section, end grain wood block, or as otherwise recommended by joist manufacturer.
3. Where required, reinforce joists at interior supports with single short length of joist section located directly over interior support, snap-on shoe, 30 percent side-piece lapped reinforcement, or other method recommended by joist manufacturer.
4. Secure joists to interior support systems to prevent lateral movement of bottom flange.
5. Provide bridging for all joist system at not more than 8'-0" on center.

K. Field Painting: Touch up shop-applied protective coatings damaged during handling and installation. Use galvanizing repair paint for galvanized surfaces.

END SECTION 05 40 00

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SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes the following:

1. Loose bearing and leveling plates.
2. Loose steel lintels.
3. Miscellaneous framing and supports.
4. Pipe Bollards
5. Steel Bar Grating
6. Bar-stock Ladders
7. Pre-fabricated Caged Ladders
8. Support for ceiling hung toilet compartments
9. Metal Stairs
10. Nosings For Concrete-filled Metal Pan Stairs
11. Shelf Angles
12. Nosings For Concrete-filled Metal Pan Stairs
13. Miscellaneous metal building system components
14. Steel angles for casting into concrete.

- B. Related Sections:

1. Structural steel is specified in another section within Division 5.
2. Additional non-ferrous Bar Gratings are specified in another section within Division 5.
3. Finish painting of steel fabrications in a Division 9 Section.

1.3 QUALITY ASSURANCE:

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.
- B. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.4 SUBMITTALS:

A. Shop Drawings:

1. Submit shop drawings for fabrication and erection of miscellaneous metal fabrications. Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others.
2. Where materials or fabrications are indicated to comply with certain requirements for design loadings include structural computations, material properties and other information needed for structural analysis.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Metals:

1. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
2. Steel Plates, Shapes and Bars: ASTM A 36.
3. Structural Steel Sheet: Hot rolled, ASTM A 570 or cold rolled ASTM A 611, Class 1; of grade required for design loading.
4. Galvanized Structural Steel Sheet: ASTM A 653/A, of grade required for design loading.
5. Steel Pipe: ASTM A 53; Type and grade (if applicable) as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (schedule 40), unless otherwise indicated.
6. Brackets, Flanges and Anchors' Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.

B. Grout:

1. Nonshrink Nonmetallic Grout: Premixed, factory packaged, nonstaining, noncorrosive, nongaseous grout complying with CE CRD-C588. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

C. Fasteners: (As Required)

1. General: Provide zinc coated fasteners for exterior use or where built into exterior walls. Selected fasteners for the type, grade and class required.
2. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.
3. Lag Bolts: Square head type, FS FF-B-561.
4. Machine Screws: Cadmium plated steel, FS FF-S-92.
5. Wood Screws: Flat head carbon steel, FS FF-S-111.
6. Plain Washers: Round, carbon steel, FS FF-W-92.
7. Masonry Anchorage Devices: Expansion shields, FS FF-S-325.
8. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required.
9. Lock Washers: Helical spring type carbon steel, FS FF-W-84.

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D. Primer Paint:

1. Shop Primer for Ferrous Metal: Fast-curing, lead and chromate-free, universal modified-alkyd primer complying with performance requirements in FS TT-P-664; selected for good resistance to normal atmospheric corrosion, compatibility with finish paint systems indicated, and capability to provide a sound foundation for field-applied topcoats despite prolonged exposure.
2. Do not apply primer to galvanized surfaces.
2. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in galvanized steel, complying with SSPC-Paint 20.
3. Bituminous Paint: Cold-applied asphalt mastic complying with SSPC-Paint 12, except containing no asbestos fibers; or cold-applied asphalt emulsion complying with ASTM D 1187.

2.2 FABRICATION, GENERAL:

A. Workmanship:

1. Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in finished product. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.
2. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32 inch unless otherwise shown. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
3. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
4. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown or, if not shown, Phillips flat-head (countersunk) screws or bolts.
5. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
6. Cut, reinforce, drill and tap miscellaneous work as indicated to receive finish hardware and similar items.

B. Galvanizing:

1. Provide a zinc coating for those items shown or specified to be galvanized, as follows:
 - a. ASTM A 153 for galvanizing iron and steel hardware.
 - b. ASTM A 123 for galvanizing both fabricated and unfabricated iron and steel products made of uncoated rolled, pressed and forged shapes, plates, bars and strip 22 gage, 0.0299 inch thick, or thicker.

2. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.

C. Shop Painting:

1. Shop paint miscellaneous metal work, except members or portions of members to be embedded in concrete or masonry, surfaces and edges to be field welded and galvanized surfaces, unless otherwise specified.
2. Remove scale, rust and other deleterious materials before applying shop coat. Clean off heavy rust and loose mills scale in accordance with SSPC Sp-2 "Hand Tool Cleaning," or SSPC SP-3 "Power Tool Cleaning," or SSPC SP-7 "Brush-Off Blast Cleaning."
3. Remove oil, grease and similar contaminants in accordance with SSC SP-1 "Solvent Cleaning."
4. Immediately after surface preparation, brush or spray on primer in accordance with manufacturer's instructions and at a rate to provide uniform dry film thickness of 2.0 mils for each coat. Use painting methods which will result in full coverage of joints, corners, edges and exposed surfaces.
5. Apply one shop coat to fabricated metal items, except apply 2 coats of paint to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

2.3 MISCELLANEOUS METAL FABRICATIONS:

A. Pipe Bollards:

1. Fabricate pipe bollards from Schedule 80 galvanized steel pipe. Size as indicated on drawings. Grout solid with concrete.

B. Rough Hardware:

1. Furnish bent or otherwise custom bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division 6 sections.
2. Manufacturer or fabricate items of sizes, shapes and dimensions required. Furnish malleable iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

C. Bar-stock Ladders:

1. Fabricate ladders for the locations shown, with dimensions, spacings, details and anchorages as indicated. Comply with the requirements of ANSI A14.3, except as otherwise indicated.
 - a. Unless otherwise shown, provide 1/2 inch x 2-1/2 inches continuous structural steel flat bar side rails with eased edges, space 18 inches apart.
 - b. Provide 3/4 inch diameter solid structural steel bar rungs, spaced 12 inches on center.

2. Fit rungs in centerline of side rails, plug weld and grind smooth on outer rail faces.
3. Support each ladder at top and bottom and at intermediate points spaced not more than 5 feet-0 inches on center. Use welded or bolted steel brackets, designed for adequate support and anchorage and to hold the ladder clear of the wall surface with a minimum of 7 inches clearance from wall to centerline of rungs. Extend rails 42 inches above top rung and return rails to wall or structure unless other secure handholds are provided. If the adjacent structure does not extend above the top rung, gooseneck the extended rails back to the structure to provide secure ladder access.
4. Provide nonslip surface on the top of each rung, either by coating the rung with aluminum oxide granules set in epoxy resin adhesive or by using a type of manufactured rung which is filled with aluminum oxide grout.
5. Provide all necessary brackets and fittings for installation.
6. Prime steel ladders, including rungs, brackets, and fasteners, with primer as specified elsewhere in this section.

D. Pre-fabricated Caged Ladders:

1. Provide steel pre-fabricated caged ladders in accordance with OSHA standards. Provide all brackets and fittings for complete installation.
2. Acceptable manufacturers:
 - a. Cubic Designs, New Berlin, WI
 - b. Bustin Industrial Products, East Stroudsburg, PA
 - c. Karnel, Inc., Clarks Summit, PA
 - d. Architect pre-approved equal.
3. Provide lockable security closure panel spanning rungs for a minimum of 8 feet above bottom of ladder.
4. Submit a complete set of shop drawings to address the specific requirements of each location in the Project.
5. Prime steel ships' ladders, including treads, railings, brackets, and fasteners, with primer as specified elsewhere in this section.

E. Loose Bearing and Leveling Plates:

1. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction, made flat, free from warps or twists and of required thickness and bearing area. Drill plates to receive anchor bolts and for grouting as required. Galvanized after fabrication.
2. Weld Plates for Roof Joists: Provide 7 inches x 1/4 inch x 0 feet-7 inch weld plates with on 3/4 inch x 5 inches headed stud.

F. Loose Steel Lintels:

1. Provide loose structural steel lintels for openings and recesses in masonry walls and partitions as shown. Weld adjoining members together to form a single unit

where indicated. Provide not less than 8 inches bearing at each side of openings, unless otherwise shown.

2. Galvanized loose steel lintels to be installed in exterior walls.
3. Provide loose steel lintels over exterior and interior openings including openings for mechanical work such as louvers, heating units, ventilators, sheet metal ducts, grilles, unless otherwise indicated. Bear 8 inches unless otherwise indicated. Provide all angles, lintels as required for all built-in items and openings.
4. Provide lintels as follows unless otherwise indicated:

Wall <u>Thickness</u>	<u>Span to 4 Feet</u>	<u>Span 4 to 7 Feet</u>
4"	(1) 3-1/2"x3-1/2"x5/16"	(1) 3-1/2"x3-1/2"x5/16"
6"	(1) WT4 x 6.5	(1) WT4 x 6.5
8"	(2) 3-1/2"x3-1/2"x5/16"	(2) 4"x3-1/2"x5/16"
12"	(3) 3-1/2"x3-1/2"x5/16"	(3) 4"x3-1/2"x5/16"

G. Miscellaneous Framing and Supports:

1. Provide miscellaneous steel framing and supports which are not a part of structural steel framework, as required to complete work.
2. Fabricate miscellaneous units to sizes, shapes and profiles shown or, if not shown, of required dimensions to receive adjacent work to be retained by framing. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.
3. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.
 - a. Except as otherwise shown, space anchors 24 inches on center and provide minimum anchor units 1-1/4 inches x 1/4 inch x 8 inches steel straps.
4. Galvanize miscellaneous frames and supports where indicated.

H. Miscellaneous Steel Trim:

1. Provide shapes and sizes for profiles shown. Except as otherwise noted, fabricate units from structural steel shapes and plates and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings and anchorages as required for coordination of assembly and installation with other work.
2. Galvanize miscellaneous steel trim where indicated.

I. Steel Pipe Railings and Handrails:

1. Fabricate railings of 1-1/4 inches nominal diameter standard steel pipe (1.660 O.D.). Space posts not more than 6 feet-0 inches on center unless otherwise indicated.

2. Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, except as otherwise indicated.
 - a. At tee and cross intersections provide coped joints.
 - b. At bends interconnect pipe by means of prefabricated elbow fittings or flush radius bends, as applicable, or radiuses indicated.
 - c. At elbow bends provide mitered joints.
 - d. Form bends by use of prefabricated elbow fittings and radius bends or by bending pipe, at fabricator's option.
3. Form simple and compound curves by bending pipe in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting or otherwise deforming exposed surfaces of pipe.
4. Provide wall returns at ends of wall mounted handrails, except where otherwise indicated.
5. Close exposed ends of pipe by welding 3/16 inch thick steel plate in place or by use of prefabricated fittings.
6. Toe Boards: Where indicated, provide toe boards at railings around openings and at the edge of open-sided floors and platforms. Fabricate to the dimension and details shown, or if not shown, use a 4 inches high x 1/8 inch plate welded to and centered between each railing post.
7. Brackets, Flanges, Fittings and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings and anchors for interconnection of pipe and attachment of railings and handrails to other work. Furnish inserts and other anchorage devices for connection railings and handrails to concrete or masonry work.
 - a. For railing posts set in concrete provide sleeves of galvanized steel pipe not less than 6 inches long and with an inside diameter not less than 1/2 inch greater than the outside diameter of pipe. Provide steel plate closure welded to bottom of sleeve and of width and length not less than 1 inch greater than outside diameter of sleeve.
 - b. Provide friction fit, removable covers designed to keep sleeves clean and hold top edge of sleeve 1/2 inch below finished surface of concrete.
8. Galvanize exterior steel railing and interior steel railings where shown, including pipe, fittings, brackets, fasteners and other ferrous components. Provide black steel pipe for interior railings not indicated otherwise.

J. Steel Grating:

1. Provide steel bar gratings using bars of type, material, sizes, spacing and construction indicated, or if not indicated, to support design loadings indicated. Comply with applicable requirements of NAAMM "Metal Bar Grating Manual." Work to dimensions shown or accepted on shop drawings, using proven details of fabrication or support.
 - a. Type: Pressure - locked
 - b. Loading for horizontal traffic.

- c. Traffic Surface: Plain
 - d. Steel Finish: Hot-dip galvanized after fabrication
2. Provide removable grating sections with end-banding bars for each panel, 4 saddle clip anchors designed to fit over 2 bearing bars and 4 stud bolts with washer and nuts, unless otherwise indicated.
 3. Notch gratings for penetrations as indicated. Layout units to allow grating removal without disturbing items penetrating grating.
 4. Provide banding for openings in grating separated by more than 4 bearing bars, of same material and size as bearing bars, unless otherwise indicated.
 5. Notching of bearing bars as supports to maintain elevations will not be permitted.
 6. Weld stud bolts to receive saddle clip anchors to supporting steel members.

K. Steel Framed Stairs:

1. General: Construct stairs to conform to sizes and arrangements shown; join pieces together by welding unless otherwise indicated. Provide complete stair assemblies including metal framing, hangers, columns, railings, newels, balusters, struts, clips, brackets, bearing plates and other components for the support of stairs and platforms and as required to anchor and contain the stairs on the supporting structure.
2. Stair Framing:
 - a. Fabricate stringers of structural steel channels or plates or a combination thereof, as shown. Provide closures for exposed ends of stringers. Construct platforms of structural steel channel header and miscellaneous framing members as shown. Bolt or weld headers to stringers and newels and framing members to stringers and headers; fabricate and join so that bolts, if used, do not appear on finish surfaces.
 - b. Where masonry walls support steel stairs, provide temporary supporting struts designed for erection of steel stair components before installation of masonry.
3. Metal Pan Risers, Subtreads, and Subplatforms: Shape metal pans for risers and subtreads to conform to configuration shown. Provide thickness of structural steel sheet for metal pans indicated but not less than that required to support total design for loading. Fabricate pans for concrete fill without voids to completely contain concrete without leakage.
 - a. Form metal pans of hot rolled or cold rolled carbon steel sheet, unless otherwise indicated.
 - b. Attach risers and subtreads to stringers by means of brackets made of steel angles or bars. Weld brackets to strings and attach metal pans to brackets by welding, riveting or bolting.
 - c. Provide subplatforms of configuration and construction indicated, or if not indicated, of same metal as risers and subtreads, and in thicknesses required to support design loading. Attach subplatform to platform framing members with welds.

4. Floor Grating Treads and Platforms: Provide patterns, spacing and bar sizes indicated complying with NAAMM "Metal Bar Grating Manual."
 - a. Finish: Shop prime paint and finish paint.
5. Fabricate grating treads with steel plate nosing on one edge and with steel angle or steel plate carrier at each end for string connections. Secure treads to stringers with bolts.
6. Fabricate closed risers where indicated with formed steel plate. Secure to adjacent nosing of upper tread and back face of lower tread.
7. Fabricate grating platforms, with nosing matching that on grating treads, at all landings. Secure grating to platform frame with welds or hold down clips.
8. Stair Railings and Handrails: Comply with applicable requirements specified elsewhere in this section for steel pipe railings and handrails, and as follows:
 - a. Fabricate newels of steel tubing and provide newel caps of gray iron castings, as shown.
 - b. Railings may be bent at corners, rail returns and wall returns, instead of using prefabricated fittings.
 - c. Connect railing posts to stair framing by direct welding, except as otherwise indicated.

L. Nosings For Concrete-filled Metal Pan Stairs:

1. Basis-of Specification manufacturer and product:
 - a. Manufacturer: Wooster Products, 1000 Spruce Street, P.O. Box 6005, Wooster, OH. 44691; 1-800-321-4936.
 - b. Model: No. 231BF.
2. Subject to compliance with requirements provide listed product or Architect pre-approved equal.

M. Miscellaneous metal building system components:

1. Basis-of Specification manufacturer for sub-framing:
 - a. Manufacturer: McElroy Metals.
 - 1) CEE girts, Gauge and size as indicated.
 - 2) ZEE girts, Gauge and size as indicated.
2. Basis-of Specification manufacturer for deck:
 - a. Manufacturer: Newcor Corp.
 - 1) Type B deck, 1 1/2".
 - 2) Gauge: As Indicated on drawings.

3. Subject to compliance with requirements, provide specified product or Architect pre-approved equal.
- N. Steel Angles for Casting into Concrete:
1. Provide shapes and sizes for profiles shown. Except as otherwise noted, fabricate units from structural steel shapes and plates and steel bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings and anchorages as required for coordination of assembly and installation with other work.
 2. Weld nelson studs to inside corner of angle as detailed.
 3. Galvanize angles after studs are welded to angle.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.2 INSTALLATION:

- A. General:
1. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
 2. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing for anchors in formwork for items which are to be built into concrete, masonry or similar construction.
 3. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.
 4. Field Welding: Comply with AWS Code for procedures of manual shielded metal arc welding, appearance and quality of welds made and methods used in correcting welding work.
- B. Setting Loose Plates:

1. Clean concrete and masonry bearing surfaces of any bond reducing materials and roughen to improve bond surfaces. Clean bottom surface of bearing plates.
2. Set loose leveling and bearing plates on wedges or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims; but if protruding, cut off flush with the edge of the bearing plate before packing with grout. Use metallic nonshrink grout in concealed locations where not exposed to moisture; use nonmetallic nonshrink grout in exposed locations, unless otherwise indicated.
3. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

C. Setting Loose Lintels:

4. Place lintels with bearing distance at each end as shown; if not shown provide minimum bearing of 8 inches at each end. In hollow core c.m.u. walls, grout solid the core or cores directly under the lintel bearing areas for a depth of at least one course or tooth in a solid unit.

D. Steel Pipe Railings and Handrails:

1. Adjust railings prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated, or if not indicated, as required by design loadings. Plumb post in each direction. Secure posts and railing ends to building construction as follows.
 - a. Anchor posts in concrete by core drilling holes not less than 5 inches deep and 3/4-inch greater than outside diameter of post. Clean holes of all loose material, insert posts and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with grout manufacturer's directions.
 - b. Leave anchorage joint exposed; wipe off excess grout and leave 1/8 inch build-up, sloped away from post. For installation exposed on exterior or to flow of water, seal grout to comply with grout manufacturer's directions.
 - c. Anchor posts to steel with steel oval flanges, angle type or floor type as required by conditions, welded to posts and bolted to steel supporting members.
 - d. Anchor rail ends into concrete and masonry with steel round flanges welded to rail ends and anchored into wall construction with lead expansion shields and bolts.
 - e. Anchor rail ends to steel with oval or round flanges welded to rail ends and bolted to structural steel members, unless otherwise indicated.
 - f. Provide removable railing sections as indicated. Furnish slip-fit metal socket or sleeve for casting concrete. Accurately locate sleeves to match post spacing.
2. Secure handrails to wall with wall brackets and end fittings. Provide bracket with not less than 1-1/2 inches clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing

required for design loading. Secure wall brackets and wall return fittings to building construction as follows:

- a. Use type of bracket with predrilled hole for exposed bolt anchorage.
- b. For concrete and solid masonry anchorage, use drilled-in expansion shield and either concealed hanger bolt or exposed lag bolt, as applicable.
- c. For hollow masonry anchorage, use toggle bolts having square heads.
- d. For stud partitions use lag bolts set into wood backing between studs. Coordinate with stud installation for accurate location of backing members.

E. Bollards:

1. Cast bollards into concrete pier footing as indicated.
2. Provide a wash at the base of the bollard in the concrete base.
3. Fill bollards solidly with concrete, mounding top surface.

3.3 ADJUST AND CLEAN:

- A. Touch Up Painting: Immediately after erection, clean field welds, bolted connections and abraded areas of shop paint and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- B. For Galvanized Surfaces: Clean field welds, bolted connections and abraded areas and apply 2 coats of galvanized repair paint, according to ASTM A 780.

END SECTION 05 50 00

SECTION 05 53 13 - BAR GRATINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes metal bar gratings and metal supports for gratings.
- B. Related Requirements:
 - 1. Section 05 12 00 "Structural Steel Framing" for structural-steel framing system components.
 - 2. Section 05 55 00 "Metal Fabrications" for grating treads and landings of steel-framed stairs.

1.3 COORDINATION

- A. Coordinate installation of anchorages for gratings and supports. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Clips and anchorage devices for gratings.
 - 2. Paint products.
- B. Shop Drawings: Include plans, sections, details, and attachments to other work.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with gratings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Alfab, Inc.
 - 2. American Stair, Inc.
 - 3. Lapeyre Stair Inc.
 - 4. Mc Nichols Co.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Gratings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Limit deflection to L/360 or 1/4 inch, whichever is less.

2.3 METAL BAR GRATINGS

- A. Metal Bar Grating Standards: Comply with NAAMM MBG 531, "Metal Bar Grating Manual."
- B. Pressure-Locked, Rectangular-Bar Aluminum Grating: Fabricated by swaging crossbars between bearing bars.
 - 1. Bearing Bar Spacing: As indicated in the drawings.
 - 2. Bearing Bar Depth: As indicated in the drawings.
 - 3. Bearing Bar Thickness: As indicated in the drawings..
 - 4. Crossbar Spacing: As indicated in the drawings.
 - 5. Traffic Surface: Plain.

2.4 ALUMINUM

- A. General: Provide alloy and temper recommended by aluminum producer for type of use indicated, with not less than the strength and durability properties of alloy, and temper designated below for each aluminum form required.
- B. Extruded Bars and Shapes: ASTM B 221, alloys as follows:
 - 1. 6061-T6 or 6063-T6, for bearing bars of gratings and shapes.
 - 2. 6061-T1, for grating crossbars.
- C. Aluminum Sheet: ASTM B 209, Alloy 5052-H32.

2.5 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
 - 1. Provide stainless-steel fasteners for fastening aluminum.
- B. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, nuts, and, where indicated, flat washers; ASTM F 593 for bolts and ASTM F 594 for nuts, Alloy Group 1.
- C. Post-Installed Anchors: Torque-controlled expansion or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
 - 1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941, Class Fe/Zn 5, unless otherwise indicated.
 - 2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless-steel bolts, ASTM F 593, and nuts, ASTM F 594.

2.6 MISCELLANEOUS MATERIALS

- A. Bituminous Paint: Cold-applied asphalt emulsion complying with
- B. ASTM D 1187/D 1187M.

2.7 FABRICATION

- A. Shop Assembly: Fabricate grating sections in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch material cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form from materials of size, thickness, and shapes indicated, but not less than that needed to support indicated loads.
- D. Fit exposed connections accurately together to form hairline joints.
- E. Welding: Comply with AWS recommendations and the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.

- F. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space the anchoring devices to secure gratings, frames, and supports rigidly in place and to support indicated loads.
- G. Fabricate cutouts in grating sections for penetrations indicated. Arrange cutouts to permit grating removal without disturbing items penetrating gratings.
 - 1. Edge-band openings in grating that interrupt four or more bearing bars with bars of same size and material as bearing bars.
- H. Do not notch bearing bars at supports to maintain elevation.

2.8 GRATING FRAMES AND SUPPORTS

- A. Fabricate from metal shapes, plates, and bars of welded construction to sizes, shapes, and profiles indicated and as necessary to receive gratings. Miter and weld connections for perimeter angle frames. Cut, drill, and tap units to receive hardware and similar items.
 - 1. Unless otherwise indicated, fabricate from same basic metal as gratings.
 - 2. Equip units indicated to be cast into concrete or built into masonry with integrally welded anchors. Unless otherwise indicated, space anchors 24 inches o.c. and provide minimum anchor units in the form of steel straps 1-1/4 inches wide by 1/4 inch thick by 8 inches long.

2.9 ALUMINUM FINISHES

- A. All grating is mill finish where indicated.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing gratings to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing gratings. Set units accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete or masonry.
- D. Fit exposed connections accurately together to form hairline joints.
 - 1. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

- E. Attach toeplates to gratings by welding at locations indicated.
- F. Field Welding: Comply with AWS recommendations and the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
- G. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

3.2 INSTALLING METAL BAR GRATINGS

- A. General: Install gratings to comply with recommendations of referenced metal bar grating standards that apply to grating types and bar sizes indicated, including installation clearances and standard anchoring details.
- B. Attach removable units to supporting members with type and size of clips and fasteners indicated or, if not indicated, as recommended by grating manufacturer for type of installation conditions shown.
- C. Attach nonremovable units to supporting members by welding where both materials are same; otherwise, fasten by bolting as indicated above.

END SECTION 05 53 13

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SECTION 05 58 00 - FORMED METAL FABRICATIONS

PART 1 GENERAL

1.1 DESCRIPTION OF WORK

- A. This section includes:
 - 1. Custom stainless steel fabrication for concession counters.
- B. Related Sections:
 - 1. Division 9 Section - Gypsum Board for wall system.
 - 2. Division 9 Section - Tiling for floor system.

1.2 REFERENCES

- A. List of references:
 - 1. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip; 1999.
 - 2. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2002.
 - 3. ASTM A276 - Standard Specification for Stainless Steel Bars and Shapes; 2002.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01 33 00.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation instructions.
 - 4. Instructions for removal of protective covering.
- C. Shop Drawings: Show layout and elevations, profiles, product components, anchorages, accessories and finishes.
 - 1. Indicate dimensions and thickness of materials, connections, and details, sealants and gaskets, method of anchorage, number of anchors, supports, reinforcement, trim, flashings, accessories, materials and finishes.
 - 2. For exterior elements indicate means of concealed drainage with baffles and weeps for water that may accumulate in members of system.
- D. Certificates: Submit certified certificates of conformance as follows:

1. Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- E. Verification Samples: Submit two 4 inch long samples of each metal finish for approval by Architect.

1.5 PERFORMANCE REQUIREMENTS

- A. Performance and test requirements for high-performance coatings shall be in accordance with AAMA 2604.
- B. Design for free and noiseless vertical and horizontal thermal movement due to expansion and contraction for material temperature range of -20 degrees F to 180 degrees F (-28.9 degrees C to 82.2 degrees C). Buckling of members, opening of joints, undue stress on fasteners, failure of sealants or any other detrimental effects due to thermal movement is not permitted.

1.6 QUALITY ASSURANCE

- A. Preinstallation Meetings: Conduct a pre-installation meeting one week prior to commencing work of this section, to verify project requirements, co-ordinate with installers of other work, establish condition and completeness of building substrate, and review manufacturer's installation instructions and manufacturer's warranty requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery:
 1. Deliver in manufacturer's original, unopened, undamaged containers, with identification labels intact.
 2. Handle and store products according to manufacturer's recommendations published in technical materials. Leave products wrapped or otherwise protected and under clean and dry storage conditions until required for installation.
- B. Storage and Protection:
 1. Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.
 2. Store to protect corners and to prevent damage or marring of finish. Store under cover on building site in a manner to prevent damage.

1.8 WARRANTY

- A. Warranty period: One-year, commencing on Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide units manufactured at custom metal fabrication shops having a minimum of 5 years experience in producing work identical or similar in nature to that shown and specified herein.

2.2 MATERIALS:

- A. Stainless Steel: Comply with the following standards for the forms and types of stainless steel for the required items of work.
 - 1. Type: AISI Type 302/304, unless otherwise indicated.
 - 2. Bar Stock: ASTM A 276.
 - 3. Plate: ASTM A 167.
 - 4. Tubing: ASTM A 269.
 - 5. Castings: ASTM A 296, iron-chromium-nickel alloy.

2.3 ACCESSORIES

- A. Stainless Steel:
 - 1. Bars and Shapes: Conform to ASTM A276:
 - a. Type 304.
 - 2. Tubing: Conform to ASTM A269:
 - a. Type 304.
 - 3. Plate, Sheet and Strip: Conform to ASTM A167:
 - a. Type 304.
 - 4. Bolts, Nuts, and Washers: Conform to ASTM A354.
- B. Sealants and gaskets within system in accordance with manufacturer's standards to meet performance requirements.
- C. Fasteners: Fasteners as recommended by manufacturer. Do not expose fasteners except where unavoidable. Match finish of adjoining metal.
- D. Manufactured components: Provide components which are designed for use in fabrication of equipment for the service indicated in the drawings and which comply with relevant industry standards.

2.4 COMPONENT FINISHES

- A. Stainless Steel Materials:
 - 1. Satin Polished Finish: Number 4, satin directional polish parallel with long dimension of finished face.

2.5 FABRICATION

- A. Prepare and shape metal by:

1. Curving.
 2. Extrusion bending.
 3. RADIUSING.
 4. Stretch bending.
 5. Arc, heliarc mig, tig, spot and stud welding.
 6. Press brake metal work.
 7. Shearing, punching and polishing.
 8. Panel and surround fabrication.
- B. Prepare metal:
1. Before finish application unless acceptable results can be attained in final workpiece after finish application. Finish of final work is subject to Architect's approval.
- C. Fabricate items as indicated on drawings and as recommended by manufacturer.
1. Make lines, breaks, curves and angles sharp and true.
 2. Keep plane surfaces free from warp or buckle.
 3. Keep surfaces free of scratches or marks caused during fabrication.
 4. Cover exposed surfaces with pressure-sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
- D. Take field measurements prior to commencement of shop fabrication.
1. Field fabrication is allowed to ensure proper fit but keep field fabrication to minimum with majority of fabrication being done under controlled shop conditions.
 2. Where final dimensions cannot be established by field measurement before commencement of manufacturing, make allowance for field adjustments and thermal movement as recommended by manufacturer.
- E. Metallic Finished Items: Maintain consistent grain direction; do not rotate pieces to effect material efficiencies.

2.6 WELDING MATERIALS, FASTENERS, AND ANCHORS

- A. Welding Electrodes and Filler Metal: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded and as required for color match, strength, and compatibility in fabricated items.
- B. Fasteners for Anchoring Fabrications to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring handrails and railings to other types of construction indicated and capable of withstanding design loads.
1. For stainless-steel fabrications, use fasteners fabricated from Type 304 or Type 316 stainless steel.
- C. Fasteners for Interconnecting Fabrications: Use fasteners fabricated from same basic metal as fastened metal, unless otherwise indicated. Do not use metals that are corrosive or incompatible with materials joined.

FORMED METAL FABRICATIONS

1. Provide concealed fasteners for interconnecting fabrications and for attaching them to other work, unless otherwise indicated.
 2. Provide concealed fasteners for interconnecting fabrications and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for fabrications indicated.
 3. Provide Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.
- D. Cast-in-Place and Postinstalled Anchors: Anchors of type indicated below, fabricated from corrosion-resistant materials with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.
1. Expansion anchors.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturer's written instructions.
- B. Verify dimensions, tolerances, and method of attachment with other work on-site.
- C. Notify Architect in writing of conditions detrimental to proper and timely completion of work. Do not proceed with erection until unsatisfactory conditions have been corrected.

3.2 FABRICATION:

- A. General: Design components to allow for expansion and contraction for a minimum ambient temperature range of 100 degrees F., without causing buckling, excessive opening of joints or overstressing of welds and fasteners.
- B. Comply with AWS for recommended practices in shop welding. Provide welds behind finished surfaces without distortion or discoloration of the exposed side. Clean exposed welded joints of all welding flux and dress on all exposed and contact surfaces.
- C. Form tight joints with exposed connections accurately fitted with uniform reveals and spaces for sealants and joint fillers. Where cutting, welding and grinding are required for proper shop fitting and jointing of the work, restore finishes to eliminate any evidence of such corrective work.
- D. Do not cut, trim, weld or solder component parts during erection in manner that would damage finish, decrease strength, or result in visual imperfection or failure in performance. Return component parts that require alteration to shop for refabrication, if possible, or for replacement with new parts.

3.3 INSTALLATION

- A. Install in compliance with manufacturer's product data, including product technical bulletins, application and installation instructions.
- B. Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- C. Provide suitable means of anchorage acceptable to manufacturer such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- D. Exposed fastening devices to match finish and be compatible with material through which they pass.
- E. Do not install component parts that are observed to be defective, including warped, bowed, dented, abraded and broken members.
- F. Separate dissimilar metals and use gasketed fasteners, isolation shim, or isolation tape where needed to eliminate possibility of corrosive or electrolytic action between metals.

3.4 ADJUSTING AND CLEANING

- A. Clean installed products in accordance with AAMA 610.1 and manufacturer's instructions before owner's acceptance.
- B. Remove masking film (if used) as soon as possible after installation.
- C. Remove temporary coverings in accordance with the manufacturers instructions. Repair or replace damaged installed products.
- D. Remove from project site and legally dispose of construction debris associated with this work.
- E. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.

3.5 PROTECTION

- A. Protect installed products and finished surfaces from damage during construction.

END SECTION 05 58 00

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes the following.
 - 1. Wood grounds, nailers and blocking.
 - 2. Backing panels for Data/Comm equipment.
 - 3. Concrete flooring/sheathing panels.
- B. Related Sections:
 - 1. Architectural Woodwork is specified in another Division-6 section.

1.3 REFERENCES:

- A. Lumber Standards: Comply with PS 20 and with applicable rules of the respective grading and inspecting agencies for species and products indicated.
- B. Plywood Product Standards: Comply with PS 1 (ANSI A 199.1) or, for products not manufactured under PS 1 provisions, with applicable APA Performance Standard for type of panel indicated.

1.4 SUBMITTALS:

- A. Product Data: Submit manufacturer's specifications and installation instructions for materials.
- B. Material Certificates: Where dimensional lumber is provided to comply with minimum allowable unit stresses, submit listing of species and grade selected for each use, and submit evidence of compliance with specified requirements. Compliance may be in form of assigned copy of applicable portion of lumber producer's grading rules showing design values for selected species and grade. Design values shall be as approved by the Board of Review of American Lumber Standards Committee.
- C. Wood Treatment Data: Submit treatment manufacturer's instructions for proper use of each type of treated material.
 - 1. Pressure Treatment: For each type specified, include certification by treating plant stating chemicals and process used, net amount of preservative retained and

- conformance with applicable standards.
2. For waterborne preservatives include statement that moisture content of treated materials was reduced to a maximum of 15 percent prior to shipment to project site.
 3. Fire-Retardant Treatment: Include certification by treating plant that treatment material complies with governing ordinances and that treatment will not bleed through finished surfaces.

1.5 PRODUCT HANDLING:

- A. Delivery and Storage: Keep materials dry at all times. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and plywood and provide air circulation within stacks.

1.6 PROJECT CONDITIONS:

- A. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other work.
- B. Provide fire treated nailers, panels, blocking, grounds and sleepers in all locations necessary to comply with code requirements for applicable class of construction.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Lumber, General:
 1. Factory mark each piece of lumber with type, grade, mill and grading agency, except omit marking from surfaces to be exposed with transparent finish or without finish.
 2. Nominal sizes are indicated, except as shown by detail dimensions. Provide actual sizes as required by PS 20, for moisture content specified for each use.
 - a. Provide dressed lumber, S4S, unless otherwise indicated.
 - b. Provide seasoned lumber with 19 percent maximum moisture content at time of dressing.
 - c. Provide unseasoned lumber with moisture content in excess of 19 percent allowed at time of dressing.
- B. Miscellaneous Lumber:
 1. Provide wood for support or attachment of other work including cant strips, buck, nailers, blocking, furring, grounds, stripping and similar members. Provide lumber of sizes shown or specified, worked into shapes shown and as follows:
 - a. Moisture content: 15 percent maximum for lumber items not specified to receive wood preservative treatment.

2. Grade: Construction Grade light framing size lumber of any species or board size lumber as required. Provide construction grade boards (RIS or WCLB) or No. 2 boards (SPIB or WWPA).
- C. Plywood:
1. Trademark: Identify each plywood panel with appropriate APA trademark.
 2. Plywood Backing Panels: For mounting electrical or telephone equipment, or backing in walls for architectural components, provide fire-retardant treated plywood panels with grade designation, APA C-D PLUGGED INT with exterior glue, in thickness indicated or, if not otherwise indicated, not less than 1/2 inch.
- D. Concrete Flooring/Sheathing Panels:
1. Basis-of-Specification manufacturer and product:
 - a. USG Structo-Crete, structural concrete panel.
 - b. Complies with ASTM E136
 - c. Meet UL & ASTM e119 listings.
 - d. Meet ASTM G21 rating of 0 for mold growth rating.
 2. Subject to compliance with requirements, Architect pre-approved products by other manufacturers may be used in the Work.
- E. Miscellaneous Materials:
1. Fasteners and Anchorages: Provide size, type, material and finish as indicated and as recommended by applicable standards, complying with applicable Federal Specifications for nails, staples, screws, bolts, nuts, washers and anchoring devices. Provide metal hangers and framing anchors of the size and type recommended by the manufacturer for each use including recommending nails. Where rough carpentry work is exposed to weather, in ground contact, associated with roofing work, or in areas of high relative humidity provide fasteners and anchorages with a hot-dip zinc (ASTM A 153).

2.2 WOOD TREATMENT:

- A. Preservative Treatment: Where lumber or plywood is indicated as "Trt-Wd" or "Treated" or is specified herein to be treated, comply with applicable requirements of AWPA Standards C2 (Lumber) and C9 (Plywood). Mark each treated item with the Quality Mark Requirements of and inspection agency approved by ALSC's Board of Review. Do not use chemicals containing chromium or arsenic.
1. Pressure-treat above ground items with waterborne preservatives to a minimum retention of 0.25 pound/cubic foot. After treatment, kiln dry lumber and plywood to a maximum moisture content of 19 percent and 15 percent respectively. Treat indicated items and the following:

- a. Wood cants, nailers, curbs, blocking, stripping and similar members in connection with roofing, flashing, vapor barriers and waterproofing.
 2. Pressure-treat the following with waterborne preservatives to a minimum retention of 0.40 pound/cubic foot:
 - a. Wood members in contact with fresh water.
 3. Complete fabrication of treated items prior to treatment, where possible. If cut after treatment, apply field treatment complying with AWPA M4 to cut surfaces.
- B. Fire-Retardant Treatment: Where "FR-S" lumber or plywood is specified or otherwise indicated provide materials which comply with AWPA standards for pressure impregnation with fire-retardant chemicals and which have a flame spread rating of not more than 25 when tested in accordance with UL Test 723 or ASTM E 84 and show no increase in flame spread and significant progressive combustion upon continuation of test for additional 20 minutes.
1. Where treated items are exposed on exterior or to high humidities or are to have a transparent finish in form of stain or sealer, provide materials which show no change in fire-hazard classification when subjected to standard rain test (UL 790 or ASTM B 2898).
 2. Use fire-retardant treatment which will not bleed through or adversely affect type of finish indicated and which does not require brush treatment of field made end cuts to maintain fire-hazard classification.
 3. Where transparent finish is indicated use type of treatment and species which permits milling of lumber after treatment without altering indicated fire-hazard classification, as determined by fire testing.
 4. Kiln dry treated items to maximum moisture content of 19 percent.
 5. Provide UL label on each piece of fire-retardant lumber or plywood.
- C. Inspect each piece of treated lumber or plywood after drying and discard damaged or defective pieces.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. General:
1. Discard units of material with defects which might impair quality of work and units which are too small to fabricate work with minimum joints or optimum joint arrangement.
 2. Set carpentry work accurately to required levels and lines, with members plumb and true and accurately cut and fitted.
 3. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by recognized standards. Countersink nail heads on exposed carpentry work and fill holes.
 4. Use common wire nails, except as otherwise indicated. Use finishing nails for

finish work. Select fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting of wood; predrill as required.

B. Wood Grounds, Nailers and Blocking:

1. Provide wherever shown and where required for screeding or attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.
2. Attach to substrates as required to support applied loading. Countersink bolts and nuts flush with surfaces, unless otherwise shown. Build into masonry during installation of masonry work. Where possible, anchor to formwork before concrete placement.
3. Provide permanent grounds of dressed, preservative treated, key-beveled lumber not less than 1-1/2 inches wide and of thickness required to bring face of ground to exact thickness of finish material involved. Remove temporary grounds when no longer required.

C. Installation of Plywood:

1. General: Comply with applicable recommendations contained in Form No. E 304, "APA Design/Construction Guide - Residential & Commercial," for types of plywood products and applications indicated.
2. Fastening Methods: Fasten panels as indicated below:
 - a. Plywood Backing Panels: Nail or screw to supports.

D. Installation of Concrete sheathing/floor panels:

1. Fasten to metal framing members with manufacturer-approved fasteners and in accordance with manufacturer's printed instructions.

END SECTION 06 10 00

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SECTION 06 20 00 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. Definition: Finish carpentry includes carpentry work which is exposed to view, is nonstructural and which is not specified as part of other sections. Types of finish carpentry work in this section include:

1. Interior running and standing trim.
2. Interior doors constructed from reclaimed wood (WD-3.)
3. Paneling, board type, exposed framing lumber (WD-3.)
4. Preparation of reclaimed wood (WD-1.)
5. Softwood Lumber for Stain Finish (WD-2.)

- B. Related Sections:

1. Reclaimed wood from demolition is specified in Division 2.
2. Rough Carpentry is specified in another section within Division 6.
3. Interior architectural woodwork is specified in another section within Division 6.
4. Builders hardware and wood doors are specified in sections within Division 8.
5. Section 08 70 00 for Barn Door Hardware.

1.3 QUALITY ASSURANCE:

- A. Factory mark each piece of lumber and plywood with type, grade, mill and grading agency identification; except omit marking from surfaces to receive transparent finish and submit mill certificate that material has been inspected and graded in accordance with requirements if it cannot be marked on a concealed surface.

1.4 SUBMITTALS:

- A. Product Data: Submit manufacturer's specifications and installation instructions for each item of factory fabricated siding and paneling.
- B. Samples: Submit the following samples for each species and cut or pattern of finish carpentry.
1. Standing and running trim for transparent finish; set of 3 pieces for boards and for each type of worked product (molding) required, 2 feet-0 inches long x full board or molding width, finished on one side and one edge.

2. Standing and running trim for paint finish; set of 3 pieces for each type of work and product required, 2 feet-0 inches long x full board or molding width, unfinished.
 3. Board trim from reclaimed wood..
- C. Wood Treatment Data: Submit chemical treatment manufacturer's instructions for proper use of each type of treated material.
1. Pressure Treatment: For each type specified, include certification by treating plant stating chemicals and process used, net amount of salts retained and conformance with applicable standards.
 2. For waterborne preservatives, include statement that moisture content of treated materials was reduced to a maximum of 15 percent prior to shipment to project site.
 3. Fire Retardant Treatment: Include certification by treating plant that treatment material complies with governing regulations, and treatment will not bleed through finished surfaces.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Protect finish carpentry materials during transit, delivery, storage and handling to prevent damage, soiling and deterioration.
- B. Do not deliver finish carpentry materials until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed in installation areas. If due to unforeseen circumstances finish carpentry materials must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

1.6 JOB CONDITIONS:

- A. Conditioning: Installer shall advise Contractor of temperature and humidity requirements for finish carpentry installation areas. Do not install finish carpentry until required temperature and relative humidity have been stabilized and will be maintained in installation areas.
- B. Maintain temperature and humidity in installation area as required to maintain moisture content of installed finish carpentry within a 1.0 percent tolerance of optimum moisture content, from date of installation through remainder of construction period. The fabricator of woodwork shall determine optimum moisture content and required temperature and humidity conditions.

PART 2 - PRODUCTS

2.1 WOOD PRODUCT QUALITY STANDARDS:

- A. Reclaimed wood products: Adhere to standards expressly specified by the product provider. Wood materials of consistent characteristics and properties as described in product source documents.

- B. Softwood Lumber Standards: Comply with PS 20 and with applicable grading rules of the respective grading and inspecting agency for the species and product indicated.
- C. Plywood Standard: Comply with PS 1.
- D. Hardwood Lumber Standard: Comply with national Hardwood Lumber Association (NHLA) rules.
- E. Woodworking Standard: Where indicated for a specific product comply with specified provision of the following:
- F. Architectural Woodwork Institute (AWI) "Quality Standards."

2.2 MATERIALS:

- A. General:
 - 1. Nominal sizes are indicated, except as shown by detailed dimensions. Provide dressed or worked and dressed lumber, as applicable, manufactured to the actual sizes as required by PS 20 or to actual sizes and pattern as shown, unless otherwise indicated.
 - 2. Moisture Content of Hardwood Lumber: Provide kiln dried lumber having a moisture content from time of manufacture until time of installation within the ranges required in the referenced woodworking standard.
 - 3. Lumber for Transparent Finish: Use pieces made of solid lumber stock.
- B. Product Types:
 - 1. Reclaimed wood from demolition (WD-1.):
 - a. Wood acquired from demolition which Owner will provide in pieces.
 - b. Work of this section includes preparation of wood members which includes but is not limited to removal of fasteners, planing and other shaping means and methods to render material suitable for final construction.
 - 2. Softwood Lumber for Stain Finish (WD-2.):
 - a. Species and Grade: Eastern white, Idaho white; Finish or 1 Common (Colonial) Grade; NeLMA, NLGA, or WWPA.
 - b. Maximum Moisture Content: 19 percent with at least 85 percent of shipment at 12 percent or less.
 - c. Finger Jointing: Not allowed.
 - d. Face Surface: Surfaced (smooth).
 - 3. Exposed Framing Lumber (WD-3): Provide material hand-selected for uniformity of appearance and freedom from characteristics, on exposed surfaces and edges, that would impair finish appearance, including decay, honeycomb, knot-holes, shake, splits, torn grain, and wane:

- a. Application: Exposed interior framing indicated to receive a stained or natural finish.
 - b. Species and Grade: Douglas fir-larch; No. 1 grade; WCLIB or WWPA.
- C. Interior Finish Carpentry:
 - 1. Standing and Running Trim for Transparent Finish as indicated in the drawings, manufactured to sizes and pattern's (profile) shown from product source's standard grades.
- D. Miscellaneous Materials:
 - 1. Fasteners and Anchorages:
 - a. Provide nails, screws and other anchoring devices of the proper type, size, material and finish for application indicated to provide secure attachment, concealed where possible and complying with applicable Federal Specifications.
 - b. Where finish carpentry is exposed in areas of high relative humidity, provide fasteners and anchorages with a hot-dipped zinc coating (ASTM A 153).

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Condition wood materials to average prevailing humidity conditions in installation areas prior to installing.
- B. Preinstallation Meeting: Meet at project site prior to delivery of finish carpentry materials and review coordination and environmental controls required for proper installation and ambient conditioning in areas to receive work. Include in meeting the Contractor, Architect and other Owner Representatives (if any), Installers of finish carpentry, wet work including plastering, other finishes, painting, mechanical work and electrical work and firms and persons responsible for continued operation (whether temporary or permanent) of HVAC system as required to maintain temperature and humidity conditions. Proceed with finish carpentry on interior only when everyone concerned agrees that required ambient conditions can be properly maintained.

3.2 INSTALLATION:

- A. Discard units of material which are unsound, warped, bowed, twisted, improperly treated, not adequately seasoned or too small to fabricate work with minimum of joints or optimum jointing arrangements or which are of defective manufacture with respect to surfaces, sizes or patterns.
- B. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8 inch in 8 foot'-0 inches for plumb and level

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countertops; and with 1/16 inch maximum offset in flush adjoining 1/8 inch maximum offsets in revealed adjoining surfaces.

- C. Scribe and cut work to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.
- D. Standing and Running Trim:
 - 1. Install with minimum number of joints possible, using full length pieces (from maximum length of lumber available) to the greatest extent possible. Stagger joints in adjacent and related members.
 - 2. Cope at returns, miter at corners, to produce tight fitting joints with full surface contact throughout length of joint. Use scarf joints for end-to-end joints.
 - 3. Make exterior joints water resistant by careful fitting.
- E. Fire Retardant Treated Wood: Handle, store and install in accordance with manufacturer's directions and as required to meet required classification or rating. Provide special fasteners, molding, adhesives and other accessories as tested and listed for type of fire retardant materials indicated.
- F. Anchor finish carpentry work to anchorage devices or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fasteners heads are required, use fine finishing nail for exposed nailings, countersunk and filled flush with finished surface and matching final finish where transparent is indicated.
- G. Install hardware to result in a completely functioning system as indicated on the drawings.

3.3 ADJUSTMENT, CLEANING, FINISHING AND PROTECTION:

- A. Repair damaged and defective finish carpentry work wherever possible to eliminate defects functionally and visually; where not possible to repair properly, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean finish carpentry work on exposed and semiexposed surfaces. Touch up shop applied finishes to restore damaged or soiled areas.
- C. Test and adjust operating hardware for smooth and trouble-free operation.
- D. Refer to Division 9 sections for final finishing of installed finish carpentry work.
- E. Protection: Installer of finish carpentry work shall advise Contractor of final protection and maintained conditions necessary to ensure that work will be without damage or deterioration at time of acceptance.

END SECTION 06 20 00

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SECTION 06 40 23 - INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes the following:

- 1. Plastic laminate finished casework.
- 2. Plastic laminate countertops.
- 3. Epoxy finishing of reclaimed wood for counter top.

- B. Related Sections:

- 1. Blocking in walls for casework is specified within another section of Division 6.
- 2. Finish Carpentry is specified in another section of Division 6.

1.3 QUALITY ASSURANCE:

- A. Quality Standards: Except as otherwise shown or specified, comply with specified provisions of the following:

- 1. Architectural Woodwork Institute (AWI) "Quality Standards."

- B. AWI Quality Marking: Mark each assembled unit of architectural woodwork with manufacturer's identification and grade mark evidencing compliance with indicated AWI quality grade. Locate grade mark on surfaces which will not be exposed after installation. For other items requiring field assembly, a certification of compliance may be substituted for marking of individual pieces.

- C. Arrange for the fabrication and installation of architectural woodwork, with sequence matched wood veneers, to be produced by a single firm.

1.4 REFERENCES:

- A. AWI Quality Standard: Comply with applicable requirements of "Architectural Woodwork Quality Standards" published by the Architectural Woodwork Institute (AWI), except as otherwise indicated.

1.5 SUBMITTALS:

- A. Product Data: Submit manufacturer's specifications and installation instructions for each item of factory fabricated woodwork.
 - 1. Certification: Include certification that fire retardant treated materials comply with governing regulations.
 - 2. Quality Certification: Submit manufacturer's (Fabricator's) certification stating that the fabricated work meets the woodwork grade(s) specified.
- B. Shop Drawings: Submit shop drawings showing location of each item, dimensioned plans and elevations, large scale details, attachment devices and other components. Submit shop drawings for the following:
 - 1. Casework.
- C. Samples: Submit the following samples for each species and cut or pattern of architectural woodwork:
 - 1. Exposed cabinet hardware, one unit of each type and finish.

1.6 PRODUCT DELIVERY, STORAGE AND HANDLING:

- A. Protect woodwork during transit, delivery, storage and handling to prevent damage, soiling and deterioration.
- B. Do not deliver woodwork, until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed in installation areas. If due to unforeseen circumstances woodwork must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

1.7 JOB CONDITIONS:

- A. Conditioning: Installer shall advise Contractor of temperature and humidity requirements for woodwork installation areas. Do not install woodwork until required temperature and relative humidity have been stabilized and will be maintained in installation areas.
- B. Maintain temperature and humidity in installation area as required to maintain moisture content of installed woodwork within a 1.0 percent tolerance of optimum moisture content, from date of installation through remainder of construction period. The fabricator of woodwork shall determine optimum moisture content and required temperature and humidity condition.

PART 2 - PRODUCTS

2.1 BASIC MATERIALS AND FABRICATION METHODS:

- A. General: Except as otherwise indicated, comply with following requirements for architectural woodwork not specifically indicated as prefabricated or prefinished standard products.

- B. Wood Moisture Content: Provide kiln dried lumber with an average content range of 6 percent to 11 percent for interior work. Maintain temperature and relative humidity during fabrication, storage and finishing operations so that moisture content values for woodwork at time of installation do not exceed the following:
 - 1. Interior Wood Finish: 5 percent-10 percent for mild regions (as defined by AWI).
- C. Plastic Laminate: Comply with NEMA LD-3; type, thickness, color, pattern and finish as indicated for each application.
- D. Plastic Laminate Substrate:
 - 1. Medium density fiberboard ANSI A208.2
or
45# density particleboard ANSI A208.1, Grade M-3.
- E. Quality Standards: For following types of architectural woodwork; comply with indicated standards as applicable:
 - 1. Casework and Countertops: AWI Section 400.
- F. Design and Construction Features: Comply with details shown for profile and construction of architectural woodwork; and where not otherwise shown, comply with applicable Quality Standards with alternate details as Fabricator's option.
- G. Precut Openings: Fabricate architectural woodwork with precut openings, where possible, to receive hardware, appliances, plumbing fixtures, electrical work and similar items. Locate openings accurately and use templates or roughing-in diagrams for proper size and shape. Smooth edges of cutoffs and where located in countertops and similar exposures seal edges of cutouts with a water resistant coating.
- H. Measures: Before proceeding with fabrication of woodwork required to be fitted to other construction, obtain measurements and verify dimensions and shop drawing details as required for accurate fit. Where sequence of measuring substrates before fabrication would delay the project, proceed with fabrication (without field measurements) and provide ample borders and edges to allow for subsequent scribing and trimming of woodwork for accurate fit.

2.2 INTERIOR ARCHITECTURAL WOODWORK:

- A. Plastic Laminate Finished Casework:
 - 1. Grade: Custom.
 - 2. Construction: Flush overlay.
 - 3. Exposed Surfaces: Provide high pressure laminate in grades indicated for the following types of surfaces:

- a. Plastic Laminate for Horizontal Surfaces: 0.050 inch thick, General Purpose Type (high pressure).
- b. Plastic Laminate for External Vertical Surfaces: 0.028 inch thick, General Purpose Type (high pressure).
- c. Plastic Laminate for Postforming: 0.042 inch thick, Postforming Type (high pressure).
- d. Plastic Laminate for Cabinet Linings: 0.020 inch thick, Cabinet Liner Type (high pressure).
- e. Plastic Laminate for Concealed Panel Backing: 0.020 inch thick, Backer Type (high pressure).
- f. Plastic Laminate Colors and Patterns: As selected by Architect from manufacturer's standard products.

- 1. Finish: Refer to "Schedule Of Interior Finishes" in the drawings.
- 2. Fabricate exposed edges of casework, including edges of doors and drawers when open, with matching plastic laminate, except as otherwise indicated.
- 3. Provide dust panels of 1/4 inch thick plywood or tempered hardboard above compartments and drawers, except where located directly below countertops.

B. Plastic Laminate Countertops:

- 1. General: Except as otherwise indicated, provide separate plastic laminate countertops (installed on other casework or other support system as indicated) to comply with requirements for casework for plastic laminate finish.
- 2. Grade: Same as casework, where casework is architectural woodwork.
- 2. Grade: Premium.
- 3. Finish of Plastic Laminate: Refer to "Schedule Of Interior Finishes" in the drawings.

C. Epoxy Finishing Of Reclaimed Wood For Counter Top:

- 1. General: Fabricate and finish reclaimed wood as described in the drawings for use as a countertop.
- 2. Provide epoxy resin finish with product specified as follows:
 - a. Provide "Bar Top" epoxy resin with the following characteristics:
 - 1) High gloss, high build.
 - 2) Clear, non-yellowing when used indoors.
 - 3) Pourable, self-leveling.
 - 4) Cycloaliphatic epoxy based.
 - b. Basis of specification manufacturer and product- Aero Marine Products, #400/21.
 - c. Other manufacturers having products acceptable for the work are:
 - 1) US Composites, Epoxy Kleer Coat #30
 - 2) System Three, Mirrorcoat.

- d. Subject to compliance with the requirements, provide one of the specified products or Architect per-approved equal.

2.3 CABINET HARDWARE AND ACCESSORY MATERIALS:

- A. General: Provide cabinet hardware and accessory materials associated with architectural woodwork, except for units which are specified as "door hardware" in other sections of these specifications.
- B. Hardware Standards: Except as otherwise indicated, comply with ANSI A156.9 "American National Standard for Cabinet Hardware."
 1. Quality Level: Type 2 (institutional), unless otherwise indicated.
 2. Quality Certification: Where available, provide cabinet hardware bearing the BHMA certification label, affixed either to hardware or its packaging, showing compliance with BHMA Cabinet Hardware Standard 201.
- C. Cabinet Door Hardware: Provide hinges, catches and pulls of types indicated, to properly accommodate each door size and style.
- D. Exposed Hardware Finish: Except where not available, provide exposed hardware with BHMA Code 626 satin chromium plate finish (US26D); where not available, provide either satin aluminum or satin stainless steel finish.
- E. Drawer Hardware: Provide slides and pulls of types indicated, to properly accommodate each drawer size and style.
 1. Equip each drawer with side mounted, full extension, ball bearing, nylon roller drawer slides.
- F. Locks: Where indicated, provide standard pin type or disc type (5 pins or discs) tumbler locks, keyed individually except as otherwise indicated.
- G. Shelf Supports: Where shelving is indicated inside casework, as "adjustable" provide shelf support adjustable system:
 1. Standard 32mm system holes.
 2. Double pin, clear, locking shelf support. Constructed of injection molded polycarbonate resin with screw slot and integral snap latch to prevent shelf uplift of 3/4" or 1" shelving.
 3. Must comply with Grade 3 requirements per the ANSI/BHMA A156.9-2003 specification. Able to withstand load levels to 300 pounds.
- H. Exposed Hinges: US26D finish.
 1. Approved products:
No. 1590; Stanley Hardware
- I. Concealed Hinges: US26D finish.

1. Approved products:
 - No. 75M3550; Blum, snap-on 110deg. self closing
 - No. 3703; Grass, snap-on 110deg. self closing
 - No. 4970; Hettich, snap-on 110deg. self closing

- J. Cabinet door bumpers:
 1. Self-adhesive 100% polyurethane.
 2. Transparent color.
 3. Containing UV inhibitors to prevent yellowing over time.
 4. UL 94 HB Approved
 5. Identical to Haeefele No. 356.25.405

- K. Pulls: US 26D finish.
 1. Approved products:
MC-402-4; Epc
4483; Stanley Hardware

- L. Worktop Brackets:
 1. Powder coated Steel:
 - a. Basis of specification Manufacturer/Model:
 - 1) A & M Hardware, 400 W. Gamby Street, Manheim, PA 17545, 1-888-647-0200.
 - 2) Architect approved equal.
 - b. Leg Dimensions: As indicated on drawings.
 - c. Color to be selected by Architect from Manufacturer's standard offerings.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Condition woodwork to average prevailing humidity conditions in installation areas prior to installing.

- B. Preinstallation Meeting: Meet at project site prior to delivery of architectural woodwork and review coordination and environmental controls required for proper installation and ambient conditioning in areas to receive work. Include in meeting the Contractor; Architect and other Owner Representative (if any); installers of architectural woodwork, wet work such as plastering, other finishes, painting, mechanical work and electrical work; and firms or persons responsible for continued operation (whether temporary or permanent) of HVAC system as required to maintain temperature and humidity conditions. Proceed with woodwork installation only when everyone concerned agrees that required ambient conditions can be properly maintained.

- C. Deliver concrete inserts and similar anchoring devices to be built into substrates well in advance of time substrates are to be built.
- D. Prior to installation of architectural woodwork, examine shop fabricated work for completion and complete work as required including back priming and removal of packing.

3.2 INSTALLATION:

- A. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims. Install to a tolerance of 1/8 inch in 8 feet-0 inches for plumb and level (including countertops); and with 1/16 inch maximum offset in flush adjoining surfaces, 1/8 inch maximum offsets in revealed adjoining surfaces.
- B. Scribe and cut work to fit adjoining work and refinish cut surfaces or repair damaged finish at cuts.
- C. Anchor woodwork to anchors or blocking built-in or directly attached to substrates. Secure to grounds, stripping and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Except where prefinished matching fastener heads are required, use fine finishing nails for exposed nailing, countersunk and filled flush with woodwork and matching final finish where transparent finish is indicated.
- D. Casework: Install without distortion so that doors and drawers will fit openings properly and be accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete the installation of hardware and accessory items as indicated. Maintain veneer sequence matching (if any) of casework with transparent finish.
- E. Countertops: Anchor securely to base units and other support systems as indicated.

3.3 ADJUSTMENT, CLEANING, FINISHING AND PROTECTION:

- A. Repair damaged and defective woodwork wherever possible to eliminate defects functionally and visually; where not possible to repair properly, replace woodwork. Adjust joinery for uniform appearance.
- B. Clean hardware, lubricate and make final adjustments for proper operation.
- C. Clean woodwork on exposed and semiexposed surfaces. Touch up shop applied finishes to restore damaged or soiled areas.
- D. Complete the finishing work specified as work of this section, to whatever extent not completed at shop or prior to installation of woodwork.
- E. Refer to the Division 9 sections for final finishing of installed architectural woodwork.
- F. Protection:

1. Installer of architectural woodwork shall advise Contractor of final protection and maintained conditions necessary to ensure that work will be without damage or deterioration at time of acceptance.
2. Cover completed work with 4 mil polyethylene film protective enclosure, applied in a manner which will allow easy removal and without damage to woodwork or adjoining work. Remove cover immediately before time of final acceptance.

END SECTION 06 40 23

SECTION 06 64 00 PVC WALL PANELING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 SECTION INCLUDES

- A. Exterior-grade PVC wall panels.

1.3 RELATED SECTIONS

- A. Section 07 92 00 - Joint Sealants.

1.4 REFERENCES

- A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 - Submittal Procedures.
- B. Product Data: Submit manufacturer's product data, including the following:
 - 1. Panel and trim details.
 - 2. Installation instructions.
- C. Samples:
 - 1. Submit manufacturer's samples of wall panels, including tongue-and-groove edges and nailing fins.
 - 2. Submit manufacturer's samples of each type of trim to be installed.
- D. Manufacturer's Certification: Submit manufacturer's certification that materials comply with specified requirements and are suitable for intended application.
- E. Maintenance Instructions: Submit manufacturer's maintenance and cleaning instructions.
- F. Warranty: Submit manufacturer's standard warranty.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

- B. Storage:
 - 1. Store materials in clean, dry area indoors in accordance with manufacturer's instructions.
 - 2. Store wall panels flat.
- C. Handling: Protect materials during handling and installation to prevent damage.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Installing Wall Panels:
 - 1. Cold Temperatures: When installing wall panels in temperatures below 40 degrees F, Warm to a minimum of 60 degrees F overnight and leave space between panels to allow for expansion in accordance with manufacturer's instructions.
 - 2. Warm Temperatures: When installing wall panels in temperatures above 70 degrees F, warm panels to a minimum of 60 degrees F in accordance with manufacturer's instructions.
- B. Cutting Wall Panels:
 - 3. Cold Temperatures: Before field-cutting wall panels in temperatures below 40 degrees F, warm panels to a minimum of 60 degrees F overnight. P

1.8 WARRANTY

- A. Warranty Period for Wall Panels: 10 years.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Extrutech Plastics, Inc., 5902 West Custer Street, Manitowoc, Wisconsin 54220; Toll Free (888) 818-0118 Phone (920) 684-9650 Fax (920) 684-4344. Website www.epiplastics.com; E-mail info@epiplastics.com

2.2 PVC WALL PANELS

- A. Wall Panels: "P2400":
 - 1. Description: Tongue-and-groove, rib-reinforced wall panels with nailing fins.
 - 2. Material: 100 percent virgin, exterior-grade PVC.
 - 3. Outside Surface: Flat.
 - 4. Width: 24 inches.
 - 5. Thickness: 1/2 inch.
 - 6. Weight: 0.69 pound per square foot.
 - 7. Surface Burning Characteristics, ASTM E 84:

- a. Flame Spread Index: 15.
 - b. Smoke Developed Index: 350.
- 8. Color: White, glossy finish.
- 9. Nonporous
- 10. Waterproof
- 11. Corrosion proof
- 12. Acceptance:
 - a. USDA
- B. TRIM:
 - 1. Material: 100 percent virgin, exterior-grade PVC.
 - 2. Weight: 0.06 pound per linear foot. Color: Same as wall panels.
 - 3. Trim components:
 - a. J-Trim.
 - b. H-Bar.
 - c. Inside corner.
 - d. Outside Corner.

2.3 ACCESSORIES

- A. Construction Adhesive: PL400 or Liquid Nails, as recommended by wall panel manufacturer.
- B. Fasteners:
 - 1. Fastening into Wood: Stainless steel, 1-1/4-inch, No. 8 truss-head sheet metal screws.
 - 2. Fastening into Masonry: Stainless steel, Buildex Tapcon 3/16-inch by 1-1/4-inch screws,
 - 3. with 1/4-inch stainless steel washers.
 - 4. Fastening into Metal: Stainless steel, 3/4-inch, No. 8 truss-head sheet metal or flat-head Tek
 - 5. screws.
 - 6. Staples: Do not use.
- C. Joint Sealants: As specified in Section 07 92 00.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive wall panels.
- B. Notify Architect of conditions that would adversely affect installation or subsequent use.
- C. Do not begin preparation or installation until unacceptable conditions are corrected.

3.2 PREPARATION

- A. Notify Architect of conditions that would adversely affect installation or subsequent use.
- B. Ensure wall panels are dry and clean.

3.3 INSTALLATION

- A. Install wall panels in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Install wall panels plumb, level, square, flat, and in proper alignment.
- C. Install trim in accordance with manufacturer's instructions.
- D. Anchor wall panels with construction adhesive and fasteners in accordance with manufacturer's instructions.
- E. Fasteners:
 - 1. Install fasteners 16 inches to 24 inches on center into nailing fins.
 - 2. Keep top of screw head 1/16 inch above top of nailing fins, allowing panels to move slightly.
 - 3. Do not recess screw heads into nailing fins.
 - 4. Ensure nailing fins lay flat against surface, not deformed around screw heads.
 - 5. Ensure fasteners are not exposed.
- F. Cutting Wall Panels:
 - 1. Field-cut panels as necessary in accordance with manufacturer's instructions.
 - 2. Ensure cuts are straight, square, and do not damage panels.
- G. Apply joint sealants as specified in Section 07 92 00.

3.4 ADJUSTING

- A. Repair minor damages to finish in accordance with manufacturer's instructions and as approved by Architect.
- B. Remove and replace damaged wall panels in accordance with manufacturer's instructions.
- C. Apply joint sealants as specified in Section 07 92 00.

3.5 CLEANING

- A. Clean wall panels promptly after installation in accordance with manufacturer's instructions.
- B. Do not use harsh cleaning materials or methods that could damage finish.

3.6 PROTECTION

- A. Protect installed wall panels from damage during construction.

END SECTION 06 64 00

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SECTION 06 64 05 - FIBERGLASS REINFORCED PLASTIC PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes the following:
 - 1. Fiberglass reinforced plastic wall panels and associated trim.

1.3 SUBMITTALS:

- A. Product Data: Submit product data on panels, adhesives and associated trim accessories.
- B. Samples: Submit samples of panels and trim. Submit samples of colors available for color selection.

1.4 PROJECT CONDITIONS:

- A. Field Measurements: Verify dimensions by field measurements.

1.5 DELIVERY AND STORAGE OF MATERIALS:

- A. Lay panels flat. Do not store on concrete surface. Do not store on edge.
- B. Damaged and deteriorated materials shall be removed from the premises.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Manufacturers:
 - Kemlite: Fire-X Glasbord.
 - Marlite: "Standard" FRP.
 - Nudo: Fiber-Lite Liner Panels.
 - Sequentia: 77136 Fire Retardant Wall Panels.

2.2 MATERIALS:

- A. Panels: Panels shall be fiberglass reinforced plastic panels with a Class "A" rating. The surface of the panel facing the space shall have a textured finish. Panels shall be USDA

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accepted for incidental food contact. Color as selected by Architect from Manufacturer's standard colors available.

- B. Panel Thickness: .090 inches thick.
- C. Trim/Moldings: Shall be one or two piece bright anodized aluminum.
 - 1. Outside corner, inside corner, edge, butt joint.
- D. Adhesive: Manufacturer's standard for substrate encountered.
- E. Sealants: Manufacturer's standard silicone based sealant.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Inspect substrate material. Substrate shall be flat, clean, dry, and free of all dirt, dust or grease.

3.2 INSTALLATION:

- A. Install panels and trim per manufacturer's instructions. Make appropriate allowances for expansion and contraction of materials. Adhere panels to substrate. No exposed fasteners will be allowed.
- B. Set trim and panel joints with a bead of sealant to seal the joint.

END SECTION 06 64 05

SECTION 07 21 00 - THERMAL INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. Extent of insulation work is shown on drawings, by generic names or by abbreviations.
- B. Applications of insulation specified in this section include the following:
 - 1. Foundation wall insulation (supporting backfill).
 - 2. Foamed-in-place insulation.
 - 3. Blanket-type building insulation.
 - 4. Vapor retarders

1.3 RELATED WORK OF OTHER SECTIONS:

- A. Applications of insulation specified in other sections include the following:
 - 1. Thermal insulation integral to metal building system is specified in Division 13.
 - 2. Acoustic insulation related to wall systems is specified in a Division 9 section.

1.4 QUALITY ASSURANCE:

- A. Thermal Conductivity: Thicknesses shown are for thermal conductivity (k-value at 75 degrees F) specified for each material. Provide adjusted thicknesses as directed for equivalent use of material having a different thermal conductivity. Where insulation is identified by "R" value, provide appropriate thickness.
- B. Fire and Insurance Ratings: Comply with fire-resistance, flammability and insurance ratings indicated, and comply with governing regulations as interpreted by authorities.
- C. Installer: Installer of foamed-in-place insulation shall be only a firm approved by manufacturer of primary foaming materials.

1.5 SUBMITTALS:

- A. Product Data: Submit manufacturer's specifications and installation instructions for each type of insulation required.

1.6 PRODUCT HANDLING:

- A. General Protection: Do not allow insulation materials to become wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation.
- B. Protection for plastic insulation:

1. Do not expose to sunlight.
2. Protect against ignition at all times. Do not deliver plastic insulating materials to project site ahead of installation time. Complete installation and concealment of plastic materials as rapidly as possible in each area of work.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Un-Faced or Foil-Faced, Polyisocyanurate Board Insulation: ASTM C 1289, Type I, Class 1, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Atlas Roofing Corporation.
 - b. Dow Chemical Company (The).
 - c. Rmax, Inc.
 2. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.
 3. Where polyisocyanurate insulation is used above the floor line and not covered by a thermal barrier such as masonry or gypsum drywall, the insulation shall be the type that is rated as Class 2 which is code compliant for interior use without a thermal barrier.
 - a. Basis of Specification manufacturer and product:
 - 1) Atlas PRO2 insulation.
 - b. Subject to requirements, provide specified product or Architect approved equal.
- B. Mineral/Glass Fiber Blanket/Batt Insulation: Inorganic fibers formed into flexible resilient blankets or semirigid resilient sheets; ASTM C 665; density as indicated, but 1.0 lb minimum; k-value of 0.27; manufacturer's standard lengths and widths as required to coordinate with spaces to be insulated; types as follows:
1. Approved manufacturers are:
 - a. Owens-Corning Fiberglass
 - b. Johns-Manville
 - c. Rockwool Industries
 - d. U.S. Gypsum
 - e. Thermafiber Inc
 - f. Flame Spread Rating: 25 (ASTM E 84) for foil facing.
 2. Facing Types:
 - a. Type I: Unfaced unit; semirigid where required for self-support.
- C. Urethane Foamed-In-Place Plastic Insulation: Manufacturer's standard urethane or isocyanurate 2-component mix for producing rigid, closed-cell insulation by

frothing/pouring in place; 1.5 to 2.5-lb. density; 3.0 perm-inch vapor transmission; water absorption of 3.0 percent; aged k-value of 0.17.

1. Products/Manufacturers: Provide one of the following:
 - a. CSI Urethane Froth Foam; Chemetics Systems, Inc.
 - b. CPR Urethane Pour/Froth; CPR Div., Upjohn.
 - c. NCFI Foam-In-Place; No. Carolina Foam Ind., Inc.
 - d. O-C Urethane 800; Owens-Corning Fiberglass Corporation
 - e. UFC Froth Foam; United Foam Corporation.

D. Miscellaneous Materials:

1. Adhesive for Bonding Insulation: Type recommended by insulation manufacturer and complying with fire-resistance requirements.
2. Mechanical Anchors: Type and size shown or, if not shown, as recommended by insulation manufacturer for type of application and condition of substrate.
3. Mastic Sealer: Type recommended by insulation manufacturer for bonding edge joints between units and filling voids in work.
4. Polyethylene Vapor Retarder: ASTM D 4397, 6 mils thick, with maximum permeance rating of 0.13 perm.
5. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor retarder manufacturer for sealing joint and penetrations in vapor retarder.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Installer must examine substrate and conditions under which insulation work is to be performed and must notify Contractor in writing of unsatisfactory conditions. Do not proceed with insulation work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.2 INSTALLATION:

A. General:

1. Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.
2. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.
3. Apply a single layer of insulation of required thickness, unless otherwise shown or required to make up total thickness.

B. Perimeter Insulation:

1. On vertical surfaces, set units in adhesive applied in accordance with manufacturer's instructions. Use type adhesive recommended by manufacturer of insulation.

C. Rigid Wall Insulation:

1. On units of plastic insulation where not fastened by furring system, install small pads of mortar or mastic spaced approximately 1 foot-0 inches on center both ways on inside face, as recommended by manufacturer. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
2. Seal joints between closed-cell (non-breathing) insulation units by applying mastic or sealant to edges of each unit to form a tight seal as units are shoved into place. Fill voids in completed installation with mastic or sealant.
3. Wedge insulation from outside wythe of construction with small fragments of masonry materials spaced 2 foot-0 inches on center both ways.
4. Make joints tight and fill voids with mastic.

D. General Building Insulation:

1. Apply insulation units to substrate by method indicated, complying with manufacturer's recommendations. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.
2. Install mineral-fiber blankets in cavities formed by framing members according to the following requirements:
 - a. Use blanket widths and lengths that fill cavities formed by framing members. Where more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
 - b. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Stuff loose mineral fiber or foam insulation into miscellaneous voids and cavity spaces around exterior door frames, window system frames, storefront frames, window sills, louver openings, and as indicated. Compact mineral fill insulation to approximately 40 percent of normal maximum volume (to a density of approximately 2.5 lbs. per cu. ft.).

E. Installation of Vapor Retarders:

1. General: Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated or recommended. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose fiber insulation.
2. Seal vertical joints in vapor retarders over framing by lapping not less than 2 wall studs. Adhere vapor retarders to framing at top, end and bottom edges, at perimeter of wall openings, and at lap joints.
3. Seal overlapping joints in vapor retarders with adhesives or tape per vapor retarder manufacturer's printed directions. Seal butt joints and fastener penetrations with tape of type recommended by vapor retarder manufacturer. Locate all joints over framing members or other solid substrates.
4. Firmly attach vapor retarders to substrates with adhesives as recommended by vapor retarder manufacturer.
5. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with tape of type recommended by vapor retarder manufacturer to create an airtight seal between penetrating objects and vapor retarder.
6. Repair any tears or punctures in vapor retarders immediately before concealment by other work. Cover with tape or another layer of vapor retarder.

END SECTION 07 21 00

SECTION 07 21 19 - FOAMED-IN-PLACE MASONRY INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. Extent of insulation work is shown on drawings, by generic names or by abbreviations.
- B. Applications of insulation specified in this section include the following:
 - 1. Aminoplast foamed-in-place masonry cavity insulation.

1.3 RELATED WORK OF OTHER SECTIONS:

- A. Applications of insulation specified in other sections include the following:
 - 1. Single Wythe Unit Masonry is specified in Division 4.
 - 2. Thermal insulation integral to metal building system is specified in Division 13.
 - 3. Acoustic insulation related to wall systems is specified in a Division 9 section.

1.4 QUALITY ASSURANCE:

- A. Manufacturer Qualifications: Company specializing in manufacturing aminoplast masonry foam insulation that markets through authorized contract installers who are trained and equipped to inject the product in accordance with the manufacturer's printed instructions.
- B. Authorized Contract Installer Qualifications: Company authorized and trained by the manufacturer to correctly inject the product in accordance with the manufacturer's printed instructions.
- C. Upon request, the authorized contract installer shall provide the Architect with IR scans of the work. If insulation voids are shown, the voids shall be injected with insulation at no added charge to the Owner.

1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable state and federal codes and regulations with regard to flame spread, smoke developed and VOC emissions. Where licensing is required, the manufacturer shall provide the Architect with a current license prior to starting the work.

1.6 SUBMITTALS:

- A. Product Data: Submit manufacturer's specifications and installation instructions for each type of insulation required.

1.7 PRODUCT HANDLING:

- A. General Protection: Do not allow insulation materials to become wet or soiled. Comply with manufacturer's recommendations for handling, storage and protection during installation.
- B. Protection for plastic insulation:
 - 1. Do not expose to sunlight.
 - 2. Protect against ignition at all times. Do not deliver plastic insulating materials to project site ahead of installation time. Complete installation and concealment of plastic materials as rapidly as possible in each area of work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The following manufacturers and products are approved
 - 1. cfiFOAM, Inc. – Core Foam Masonry Foam Insulation or InsulSmart MH
 - 2. C. P. Chemical Co., Inc. – Tripolymer Foam Insulation
 - 3. Tailored Chemical Products, Inc. – Core-Fill 500 Foam Insulation
 - 4. Thermal Corp. of America, Inc. – Thermco Foam Insulation
 - 5. Architect pre-approved equal.

2.2 MATERIALS:

- A. Performance- Acceptable materials shall conform to the following performance criteria:
 - 1. Thermal Performance: Minimum R-4.4/inch @ 75⁰F mean temperature when measured per ASTM C 177-10 or ASTM C 518- 04.
 - 2. Surface Burning Characteristics: Class A. Flame Spread ≤ 25, Smoke Developed ≤ 450 when measured per ASTM E 84-01. Potential Heat: ≤ 7700 Btu/lb when measured per NFPA 259.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Prior to beginning the work, the authorized contract installer shall verify that concrete masonry walls to be insulated are complete and that no water is standing in the core cells of the wall. The work shall not proceed if conditions exist that conflict with the Manufacturers printed cold weather instructions.

3.2 APPLICATION:

A. General:

1. Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.

B. Foamed-in-Place Masonry Insulation:

1. Apply insulation in strict compliance with the manufacturer's printed instructions.

END SECTION 07 21 19

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SECTION 07 27 26 - FLUID APPLIED MEMBRANE AIR BARRIER

PART 1 GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 SECTION INCLUDES:

- A. Installation of liquid applied Vapor/Air barrier Membrane on standard building exterior grade surfaces indicated on drawings, consisting of preparation of existing and repaired exterior grade surfaces, sealing of cracks, seams and joints.

1.3 RELATED SECTIONS:

- A. Division 3 Section for Concrete
- B. Division 4 Section for Masonry
- C. Division 7 Section for Insulation; Vapor Barrier
- D. Division 7 Section for Metal Panel Systems
- E. Division 7 Section for Joint Sealers

1.4 REFERENCES:

- A. ASTM D 412 Tests for Rubber Properties in Tension.
- B. ASTM E Puncture Resistance.
- C. ASTM E 96(B) Water Vapor Transmission of Materials.
- D. ASTM D 1970 Self-Adhering Polymer Modified Bituminous Sheet Materials.
- E. UL 790 Tests for Fire Resistance of Roof Covering Materials.
- F. ASTM E 283 Tests for Air Leakage through Exterior Assemblies.
- G. ASTM E 331 Tests for Water Penetration of Exterior Assemblies.
- H. ASTM E 2178 Test for Air Permeance Rating.
- I. ASTM D 1187 Test for Asphalt-Base Emulsions
- J. ASTM D 2939 Test for Emulsified Bitumens

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FLUID APPLIED MEMBRANE AIR BARRIER

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1.5 SYSTEM DESCRIPTION:

- A. Product provided by this Section is a self-adhesive liquid applied membrane of not less than 40 mils thickness, consisting of a water-based asphalt emulsion modified with a blend of synthetic rubbers and additives which cures to form a flexible, monolithic Vapor/Air Barrier.

1.6 SUBMITTALS:

- A. General: Submit in accordance with General Requirements.
- B. Product Data: Submit manufacturer's product literature, installation instructions and standard details.
- C. Subcontractor approval by manufacturer: Submit document stating manufacturer's acceptance of subcontractor as an Approved Applicator for the specified materials.

1.7 QUALITY ASSURANCE:

- A. Applicator Qualifications: Applicator shall be experienced in applying the same or similar materials for at least 3 years and shall be specifically approved in writing by the membrane manufacturer.
- B. Ordinances, and laws regarding use and application of products that contain volatile organic compounds (VOC).
- C. Pre-Application Conference: Prior to beginning work, convene a conference to review conditions, installation procedures, schedules and coordination with other work.
- D. Product Components: Vapor/Air components shall be sourced from one manufacturer, including sheet membrane, accessories, sealants, primers, adhesives and mastics.

1.8 WARRANTY:

- A. Upon completion and acceptance of the work required by this section, the manufacturer will issue a warranty agreeing to promptly replace defective materials for a period of 5 years.

1.9 DELIVERIES, STORAGE AND HANDLING:

- A. Deliver materials to project site in original, factory-sealed, unopened containers bearing manufacturer's name and label intact and legible with the following information.
 - 1. Name of material.
 - 2. Manufacturer's stock number and date of manufacture.
 - 3. Materials in protected and well ventilated area.

1.10 PROJECT CONDITIONS:

- A. Do not apply membrane if temperature is less than 40 degrees F. or to a damp, frosty or contaminated surface.

- B. Coordinate vapor/air barrier application with other trades. The applicator shall have sole right of access to the specified areas for the time needed to complete the installation.
- C. Warn personnel against breathing of vapors and contact of material with skin or eyes. Wear applicable protective clothing and respiratory protection gear.
- D. Keep flammable products away from spark or flame. Do not allow the use of spark producing equipment during application and until all vapors have dissipated. Post "NO SMOKING" signs.
- E. Maintain work area in a neat and orderly condition, removing empty containers, rags, and rubbish daily from the site.

PART 2 - PRODUCTS:

2.1 MANUFACTURERS:

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Barriseal Membrane as manufactured by Carlisle Coatings and Waterproofing Incorporated, 900 Hensley Lane; Wylie, Texas 75098, Phone: (800) 527-7092 Fax: (972) 442-0076.
 - 2. Procor as manufactured by Grace Construction Products, 62 Whittemore Avenue, Cambridge, MA.

2.2 VAPOR-RETARDING MEMBRANE AIR BARRIER

- A. Fluid-Applied, Vapor-Retarding Membrane Air Barrier: Elastomeric, modified bituminous or synthetic polymer membrane.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Elastomeric, Modified Bituminous Membrane:
 - 1) Carlisle Coatings & Waterproofing Inc.; Barriseal R.
 - 2) Epro Services, Inc.; Ecoflex-R.
 - 3) Henry Company; Air-Bloc 06.
 - 4) Hohmann & Barnard, Inc.; Textroflash Liquid.
 - 5) Meadows, W. R., Inc.; Air-Shield LM.
 - 6) Tremco Incorporated, an RPM company; ExoAir 120SP/R.
 - b. Synthetic Polymer Membrane:
 - 1) Grace, W. R., & Co. - Conn.; Perm-A-Barrier Liquid.
 - 2) Henry Company; Air-Bloc 32.
 - 3) Rubber Polymer Corporation, Inc.; Rub-R-Wall Airtight.

2. Physical and Performance Properties:
 - a. Air Permeance: Maximum 0.004 cfm/sq. ft. of surface area at 1.57-lbf/sq. ft.; ASTM E 2178.
 - b. Vapor Permeance: Maximum 0.1 perm; ASTM E 96/E 96M.
 - c. Ultimate Elongation: Minimum 500 percent; ASTM D 412, Die C.

2.3 ACCESSORY MATERIALS

- A. General: Accessory materials recommended by air-barrier manufacturer to produce a complete air-barrier assembly and compatible with primary air-barrier material.
- B. Primer: Liquid waterborne or solvent-borne primer recommended for substrate by air-barrier material manufacturer.
- C. Counterflashing Strip: Modified bituminous, 40-mil- thick, self-adhering sheet consisting of 32 mils of rubberized asphalt laminated to an 8-mil- thick, cross-laminated polyethylene film with release liner backing.
- D. Butyl Strip: Vapor retarding, 30 to 40 mils thick, self-adhering; polyethylene-film-reinforced top surface laminated to layer of butyl adhesive with release liner backing.
- E. Modified Bituminous Strip: Vapor retarding, 40 mils thick, smooth surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil- thick polyethylene film with release liner backing.
- F. Joint Reinforcing Strip: Air-barrier manufacturer's glass-fiber-mesh tape.
- G. Substrate-Patching Membrane: Manufacturer's standard trowel-grade substrate filler.
- H. Adhesive and Tape: Air-barrier manufacturer's standard adhesive and pressure-sensitive adhesive tape.
- I. Sprayed Polyurethane Foam Sealant: One- or two-component, foamed-in-place, polyurethane foam sealant, 1.5- to 2.0-lb/cu. ft density; flame-spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.
- J. Modified Bituminous Transition Strip: Vapor retarding, 40 mils thick, smooth surfaced, self-adhering; consisting of 36 mils of rubberized asphalt laminated to a 4-mil- thick polyethylene film with release liner backing.
- K. Adhesive-Coated Transition Strip: Vapor-permeable, 17-mil- thick, self-adhering strip consisting of an adhesive coating over a permeable laminate with a permeance value of 37 perms.
- L. Elastomeric Flashing Sheet: ASTM D 2000, minimum 50- to 65-mil- thick, cured sheet neoprene with manufacturer-recommended contact adhesives and lap sealant with aluminum termination bars and stainless-steel fasteners.

- M. Preformed Silicone-Sealant Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates.
- N. Sealant Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Dow Corning Corporation; 123 Silicone Seal.
 - 2. Momentive Performance Materials Inc.; US11000 UltraSpan.
 - 3. Pecora Corporation; Sil-Span.
 - 4. Tremco Incorporated, an RPM company; Spectrem Simple Seal.
- O. Termination Mastic: Air-barrier manufacturer's standard cold fluid-applied elastomeric liquid; trowel grade.

PART 3 - EXECUTION:

3.1 INSPECTION:

- A. Before any barrier application is started the applicator shall thoroughly examine all surfaces for any deficiencies. Should any deficiencies exist, the architect, owner, or general contractor shall be notified in writing and corrections made.
- B. Condition of Substrate Surfaces:
 - 1. Surfaces shall be of sound structural grade and shall have a smooth finish, free of holes, cracks, or other defects.
 - 2. All mortar joints should be struck flush.
 - 3. Adjoining beams, and other substrates should be butted flush with substrates. Irregularities shall be ground or filled as required to achieve flush surfaces.
 - 4. All adjacent metal flashing shall be galvanized or non-ferrous metal, tight screwed or nailed.
 - 5. Surfaces at joints shall be on the same plane.

3.2 SURFACE PREPARATION:

- A. The wall surface must be thoroughly clean, dry and free from any surface contaminates or cleaning residue that may harmfully affect the adhesion of the membrane.
- B. All cracks over 1/16" in width should be filled with material compatible to the substrate. Most masonry and wood applications can be filled with exterior grade urethane caulking.
- C. All crack filler compound to thoroughly cure prior to proceeding.
- D. Trim or detail all door, window, and penetrations using manufacturer's standard details.
- E. Stone sill flashing should be in-place prior to application of Vapor/Air Barrier.

3.3 APPLICATION:

- A. Clean surfaces to remove residual dust before priming.
- B. Detail- Joints, seams, penetrations with either a 30 mil coat of reinforcing fabric, or apply a strip of flashing on primed surface.
- C. Apply vapor/air barrier from base of wall working up to allow water to drain over the applied area. Install at required thickness.
- D. Terminations: Apply the vapor/air barrier on to the edge of brick ledge flashing, door and window flashing tapes. Extend the vapor/air barrier up above the interior living space or on to the roof vapor/air barrier.
- E. Protection: Vapor/Air Sheet Membranes are not designed for permanent exposure and should be covered as soon as construction scheduling allows.

END OF SECTION 07 27 26

SECTION 07 42 00 – METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. The extent of each type of preformed roofing and siding is indicated on the drawings and by provisions of this section. Preformed roofing/siding is hereby defined to include panels which are structurally capable of spanning between supports spaced as indicated.
- B. The types of panels required include the following:
 - 1. Formed sheet panels, intended for concealed fastener installation.

1.3 QUALITY ASSURANCE:

A. Metal Panel 1:

- 1. Basis of specification manufacturer and product: Centria, #CS-260 panel with the following characteristics:
 - a. Width: 12 inches.
 - b. Nominal thickness: 7/8 inch.
 - c. Nominal rib spacing: 4 inches
 - d. Minimum gage: 24GA.
- 2. Other Manufacturers having products which are acceptable for installation in the Work:
 - a. Alliancewall Corp.; Alliance, OH.
 - b. Steelite, Inc.; Pittsburgh, PA.
 - c. Fabral; HCF Series.

B. Metal Panel 2:

- 1. Basis of specification manufacturer and product: "Panel Rib Wall" panel by Varco Pruden with the following characteristics:
 - a. Roll-formed panels, 3 feet wide, 26 gauge steel.
 - b. Major Rib Spacing: 12 inches on center.
 - c. Rib Height: 1 1/4 inches.
 - d. One piece from base to building eave.

1.4 SUBMITTALS:

- A. Product Data: Submit manufacturer's product specifications, standard details, certified product test results, installation instructions and general recommendations, as applicable to materials and finishes for each component and for total system of preformed panels.
- B. Samples: Submit 2 samples 12 inches square, of each exposed finish material.
- C. Shop Drawings: Submit small-scale layouts of panels on walls and roofs, and large-scale details of edge conditions, joints, corners, custom profiles, supports, anchorages, trim, flashing, closures, and special details. Distinguish between factory and field assembly work.

1.5 WARRANTY

- A. Special Warranty: Provide warranty form in which Installer agrees to repair or replace components of metal panel that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - e. Structural failures including, but not limited to, rupturing, cracking, or puncturing.
 - f. Wrinkling or buckling.
 - g. Loose parts.
 - h. Failure to remain weathertight, including uncontrolled water leakage.
 - i. Deterioration of metals, metal finishes, and other materials beyond normal weathering, including nonuniformity of color or finish.
 - j. Galvanic action between sheet metal roofing and dissimilar materials.
 - 2. Warranty Period: Two years from date of Substantial Completion.
- B. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SHEET MATERIALS:

- A. Steel for Painting/Coating: Hot-dip zinc coated steel sheet, ASTM A 446, Grade A except where higher strength required for performance, G90 zinc coating, surface treated for maximum coating performance.

- 1. Face Texture: Smooth.

2.2 METAL FINISHES:

- A. General: Apply coatings either before or after forming and fabricating panels, as required by coating process and as required for maximum coating performance capability. Protect coating promptly after application and cure, by application of strippable film or removable adhesive cover, and retain until installation has been completed.

- B. Fluorocarbon Coating:

- 1. Full-strength 70 percent "Kynar 500" coating baked-on for 15 minutes at 450 degrees F, in a dry film thickness of 1.0 mils, 30 percent reflective gloss (ASTM D 523), over 0.3 mil baked-on epoxy primer.
 - 2. Durability: Provide coating which has been field tested under normal range of weathering conditions for minimum of 20 years without significant peel, blister, flake, chip, crack or check in finish, and without chalking in excess of 8 (ASTM D 659), and without fading in excess of 5 NBS units.

- C. Panel Colors:

- 1. Metal Panel 1 Color: Centria, "Silver Metallic."
 - 2. Metal Panels 2 and 3 Color to be selected by Architect from manufacturer's standard offerings.

2.3 MISCELLANEOUS METAL FRAMING

- A. Miscellaneous Metal Framing, General: ASTM C 645, cold-formed metallic-coated steel sheet, ASTM A 653/A 653M, G40 hot-dip galvanized.

- B. Base or Sill Angles: 0.079-inch nominal thickness.

- C. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, and depth required to fit insulation thickness indicated.

- 1. Nominal Thickness: 22 gage (0.025 inch).

2.4 MISCELLANEOUS MATERIALS

- A. Panel Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal wall panels by means of plastic caps or factory-applied coating. Provide EPDM, PVC, or neoprene sealing washers.

- B. Accessories: Except as indicated as work of another specification section, provide components required for a complete siding system, including trim, corner units, clips, seam covers, flashing, sealants, gaskets, filler, closure strips and similar items for

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installation as a concealed fastener application. Match materials/finishes of preformed panels.

- C. Bituminous Coating: Cold-applied asphalt mastic, SSPC Paint 12, compounded for 15-mil dry film thickness per coat.

2.5 PANEL FABRICATION & PERFORMANCES:

- A. General: Fabricate and finish panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, and as required to fulfill performance requirements, which have been demonstrated by factory testing. Comply with indicated profiles and dimensional requirements, and with structural requirements.
- B. Metal Gages: Provide gage as specified elsewhere in this section, and if not specified, thickness required for structural performances, but not less than manufacturer's recommended minimums for profiles and applications indicated.
- C. Required Performances: Fabricate panels and other components of roof/wall system for the following installed-as-indicated performances:
 - 1. Wall Loading: 20 pounds per square foot inward; 15 pounds per square foot outward.
 - 2. Roof Loading: 40 pounds per square foot inward; 15 pounds per square foot outward.
 - 3. Water Penetration: No significant, uncontrolled leakage at 4 pounds per square foot pressure with spray test.
 - 4. Air Infiltration: 0.02 cfm per square foot for gross roof/wall areas, with 4 pounds per square foot differential pressure.
- D. Fabricate corner units in factory with mitered and continuously welded seams prior to application of primer and finishes. Grind welds smooth on panel finished face.
- E. Apply bituminous coating or other permanent separation materials on concealed panel surfaces where panels would otherwise be in direct contact with substrate materials which are noncompatible or could result in corrosion or deterioration of either material or finishes.
- F. Fabricate panel joints with captive gaskets or separator strips, which provide a tight seal and prevent metal-to-metal contact in a manner which will minimize noise from movements within panel system.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. General:
 - 1. Comply with panel fabricator's and material manufacturer's instructions and recommendations for installation, as applicable to project conditions and supporting substrates. Anchor panels and other components of the work securely in place, with provisions for thermal/structural movement.

2. Install panels with concealed fasteners.
- B. Installation tolerances: Shim and align panel units within installed tolerance of 1/4 inch in 20 foot-0 inch on level/plumb/slope and location/line as indicated, and within 1/8 inch offset of adjoining faces and of alignment of matching profiles.
 - C. Joint Sealers:
 1. Install gaskets, joint fillers and sealants where required for weatherproof performance of panel systems. Provide types of gaskets and sealants/fillers indicated or, if not otherwise indicated, types recommended by panel manufacturer.
 - D. Joint Sealers: Refer to other sections of these specifications for post-installation requirements on joints sealers; not work of this section.

3.2 CLEANING AND PROTECTION:

- A. Damaged Units: Replace panels and other components of the work which have been damaged or have deteriorated beyond successful repair by means of finish touch-up or similar minor repair procedures.
- B. Cleaning: Remove protective coverings and strippable films (if any) at time in project construction sequence which will afford greatest protection of work. Clean finished surfaces as recommended by panel manufacturer, and maintain in a clean condition during construction.
- C. Protection: Installer shall advise Contractor of protection and surveillance procedures, as required to ensure that work of this section will be without damage or deterioration at time of substantial completion.

END SECTION 07 42 00

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SECTION 07 53 23 - ETHYLENE-PROPYLENE-DIENE-MONOMER (EPDM) ROOFING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Adhered EPDM membrane roofing system.
2. Roof insulation.

B. Related Sections:

1. Section 06 10 00 Rough Carpentry for wood nailers, curbs, and blocking and for wood-based, structural-use roof deck panels.
2. Section 07 21 00 Thermal Insulation for insulation beneath the roof deck.
3. Section 07 62 00 Sheet Metal Flashing and Trim for metal roof penetration flashings, flashings, and counterflashings.
4. Section 07 92 00 Joint Sealants for joint sealants, joint fillers, and joint preparation.

1.3 DEFINITIONS

- A. Roofing Terminology: See ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.4 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.
- B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.
 - 1. Base flashings and membrane terminations.
 - 2. Tapered insulation, including slopes.
 - 3. Roof plan showing orientation of steel roof deck and orientation of membrane roofing and fastening spacings and patterns for mechanically fastened membrane roofing.
 - 4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For qualified Installer and manufacturer.
- B. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.
- C. Warranties: Sample of special warranties.

1.7 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for membrane roofing system identical to that used for this Project.
- B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.
- C. Source Limitations: Obtain components including roof insulation and fasteners for membrane roofing system from same manufacturer as membrane roofing.
- D. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
- E. Preinstallation Roofing Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Architect, roofing Installer and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 - 3. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.

4. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
5. Review roof observation and repair procedures after roofing installation.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.9 PROJECT CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.10 WARRANTY

- A. Special Warranty: Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.
 1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 – PRODUCTS

2.1 EPDM MEMBRANE ROOFING

- A. EPDM: ASTM D 4637, Type I, non-reinforced, uniform, flexible EPDM sheet.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Carlisle SynTec Incorporated.
 - b. ERSystems.
 - c. Firestone Building Products.
 - d. GAF Materials Corporation.
 - e. GenFlex Roofing Systems.
 - f. International Diamond Systems.
 - g. Johns Manville.
 - h. Mule-Hide Products Co., Inc.
 - i. Protective Coatings, Inc.
 - j. Roofing Products International, Inc.
 - k. StaFast Building Products.
 - l. Versico Incorporated.
2. Thickness: 60 mils, nominal.
3. Exposed Face Color: Black.

2.2 AUXILIARY MEMBRANE ROOFING MATERIALS

- A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
 1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
- B. Sheet Flashing: 60-mil- thick EPDM, partially cured or cured, according to application.
- C. Bonding Adhesive: Manufacturer's standard.
- D. Seaming Material: Single-component, butyl splicing adhesive and splice cleaner.
- E. Lap Sealant: Manufacturer's standard, single-component sealant.
- F. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.
- G. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch thick; with anchors.
- H. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick, prepunched.
- I. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to substrate, and acceptable to roofing system manufacturer.

- J. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

2.3 SUBSTRATE BOARDS

- A. Substrate Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/4 inch.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Georgia-Pacific Corporation; Dens Deck.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate panel to roof deck.

2.4 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by EPDM membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.
- B. Tapered Board insulation at non-sloped roof decks:
 - 1. Molded-Polystyrene Board Insulation: ASTM C 578, Type II, 1.35-lb/cu. ft. minimum density.
 - 2. Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches unless otherwise indicated.
- C. Tapered Board insulation under roof paver system:
 - 1. Molded-Polystyrene Board Insulation: ASTM C 578, Type IX, 1.8-lb/cu. ft. minimum density.
- D. Insulation at sloped roof decks:
 - 1. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
- E. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.5 INSULATION ACCESSORIES

- A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.

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- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.
- C. Modified Asphaltic Insulation Adhesive: Insulation manufacturer's recommended modified asphalt, asbestos-free, cold-applied adhesive formulated to attach roof insulation to substrate or to another insulation layer.
- D. Bead-Applied Insulation Adhesive: Insulation manufacturer's recommended bead-applied, low-rise, one- or multicomponent urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.
- E. Full-Spread Applied Insulation Adhesive: Insulation manufacturer's recommended spray-applied, low-rise, two-component urethane adhesive formulated to attach roof insulation to substrate or to another insulation layer.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
 - 1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
 - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
- C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 SUBSTRATE BOARD

- A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.
 - 1. Fasten substrate board to top of roof deck to resist uplift pressure at corners, perimeter, and field of roof according to membrane roofing system manufacturers' written instructions.

3.4 INSULATION INSTALLATION

- A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
- B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Install tapered insulation under area of roofing to conform to slopes indicated.
- D. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
 - 1. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
- E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- F. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
 - 1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.
- G. Mechanically Fastened and Adhered Insulation: Install first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
 - 1. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
 - 2. Set each subsequent layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.5 ADHERED MEMBRANE ROOFING INSTALLATION

- A. Adhere membrane roofing over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll membrane roofing and allow to relax before installing.

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- B. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- C. Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.
- D. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeters.
- E. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
- F. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement, and firmly roll side and end laps of overlapping membrane roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of membrane roofing terminations.
- G. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping membrane roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of membrane roofing terminations.
- H. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.
- I. Spread sealant or mastic bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

3.6 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.
- E. Terminate and seal top of sheet flashings.

3.7 FIELD QUALITY CONTROL

- A. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

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- B. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.
- C. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.8 PROTECTING AND CLEANING

- A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove membrane roofing system that does not comply with requirements, repair substrates and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

END SECTION 07 53 23

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SECTION 07 62 00 - SHEET METAL FLASHING TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes the following:

1. Metal counter flashing; and base flashing.
2. Metal Copings.
3. Metal Fascia.
4. Metal sump pan for roof drains.
5. Built-in metal scuppers.
6. Exposed metal trim/fascia units.
7. Miscellaneous sheet metal accessories.
8. Elastic flashing.
9. Metal drip edge for through wall flashing assembly.
10. Perforated Metal Soffit Panels.

- B. Related sections:

1. Through wall flashing assemblies are specified in Division 4 Section "Unit Masonry".
2. Roofing accessories are specified in another Division 7 Section.
3. Metal Building Systems in Division 13.

1.3 SUBMITTALS:

- A. Product Data; Flashing, Sheet Metal, Accessories: Submit manufacturer's product specifications, installation instructions and general recommendations for each specified sheet material and fabricated product.
- B. Samples; Flashing, Sheet Metal, Accessories:
1. Submit 2, 8 inch square samples of specified sheet materials to be exposed as finished surfaces.
 2. Submit 2, 12 inch long, completely finished units of specified factory-fabricated products exposed as finished work.
- C. Shop Drawings; Flashing, Sheet Metal, Accessories: Submit shop drawings showing layout, joining, profiles, and anchorages of fabricated work, including major counter flashings, trim/fascia units, scuppers and expansion joint systems; layouts at 1/4 inch scale, details at 3 inch scale.

1.4 JOB CONDITIONS:

- A. Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of the work and protection of materials and finishes.

PART 2 - PRODUCTS

2.1 FLASHING AND SHEET METAL MATERIALS:

A. Sheet Metal Flashing/Trim:

1. Paint coated sheet steel for roof drain sump pan: Shop formed, 0.028 inches (24 gage) thick prior to painting, hot-dipped galvanized steel, commercial quality AISI G90 extra smooth.
2. Flashing Drip: Provide 0.022 inches thick, paint coated steel sheet drip for through wall flashing assembly specified in "Unit Masonry" Section. Drip shall be 3 inches deep and of longest length practical. One long edge shall be bent 45 degrees to create a 1/2 inch drip. Edge of 1/2 inch drip shall be double rolled (hemmed) to eliminate sharp edges. Bend shall be straight and constant.
3. Miscellaneous Materials and Accessories: (As required by flashing manufacturer).
 - a. Fasteners: Same metal as flashing/sheet metal or, other noncorrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.
 - b. Bituminous Coating: FS TT-C-494 or SSPC - Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.
 - c. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.
 - d. Elastomeric Sealant: Generic type recommended by manufacturer of metal and fabricator of components being sealed; comply with FS TT-S-0027, TT-S-00230, or TT-S-001543.
 - e. Paper Slip Sheet: 5-lb rosin-sized building paper.
 - f. Polyethylene Underlayment: 6-mil carbonated polyethylene film; FS L-P-512.
 - g. Metal Accessories: Provide sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed, noncorrosive, size and gage required for performance.
 - h. Elastic Flashing Filler: Closed-cell polyethylene or other soft closed-cell material recommended by elastic flashing manufacturer as filler under flashing loops to ensure movement with minimum stress on flashing sheet.
 - i. Roofing Cement: ASTM D 4586, Type I, asbestos free, asphaltic based.

2.2 FABRICATED UNITS:

- A. General Metal Fabrication: Shop fabricate work to greatest extent possible. Comply with details shown, and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations. Form exposed sheet metal work without excessive oil-canning, buckling and tool marks, true to line and levels as indicated, with exposed edges folded back to form hems.
- B. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. For metal other than aluminum, tin edges to be seamed, form seams, and solder. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required.
- C. Expansion Provisions: Where lapped or bayonet type expansion provisions in work cannot be used, or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- D. Sealant Joints: Where movable, nonexpansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with industry standards.
- E. Separations: Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.
- F. Gravel stops and joint covers: Extruded or formed aluminum, alloy 6063-T52 unless otherwise required for type of finish.
 - 1. Finish: Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat.
- G. Flashing reglets: Extruded aluminum, alloy 6063-T5, standard mill finish. Approved products are as follows:
 - 1. Cushion Lock B-2; Superior Concrete Accessories, Inc.
 - 2. Temline; Tremco

2.3 PERFORATED METAL SOFFIT PANELS:

- A. Manufacturer and Model:
 - 1. Basis of specification Manufacturer and models:
 - a. Firestone, Una-Clad, UC-500, with flush interlocking joint for concealed fastener attachment.
 - b. Firestone, Una-Clad, UC-500V, vented with flush interlocking joint for concealed fastener attachment.
 - c. Provide Kynar 500/Hylar 500 coated 0.032-inch thick aluminum panel.

- 1) Colors: Metal soffit panel 1- Silver Metallic; Metal soffit panel 2- Charcoal Grey.
 - d. Provide panel as vented and non-vented in manufacturer's standard configuration.
 - e. Provide 20-inch wide x 1-inch deep panel profile.
 - f. Provide trim and termination components where necessary.
 2. Provide product as specified or equivalent product by other manufacturers.
- B. Hardware and Trim: Provide all hardware, clips, edge trim and fasteners to install to substrates as indicated.

PART 3 - EXECUTION

3.1 INSTALLATION REQUIREMENTS:

- A. General: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations, and with SMACNA "Architectural Sheet Metal Manual." Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints and seams which will be permanently watertight and weatherproof.
- B. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.
- C. Install reglets to receive counter flashing in manner and by methods indicated. Where shown in concrete, furnish reglets to trades of concrete work for installation as work of Division 3 sections. Where shown in masonry, furnish reglets to trades of masonry work, for installation as work of Division 4 sections.
- D. Install counterflashing in reglets, either by snap-in seal arrangement, or by wedging in place for anchorage and filling reglet with mastic or elastomeric sealant, as indicated and depending on degree of sealant exposure.
- E. Nail flanges of expansion joint units to curb nailers, at maximum spacing of 6 inches. Complete seams at joints between units, to form a continuous waterproof system.

3.2 CLEANING AND PROTECTION:

- A. Clean exposed metal surfaces, removing substances which might cause corrosion of metal or deterioration of finishes.
- B. Protection: Installer shall advise Contractor of required procedures for surveillance and protection of flashings and sheet metal work during construction, to ensure that work will be without damage or deterioration, other than natural weathering, at time of substantial completion.

END SECTION 07 62 00

SECTION 07 72 00 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. The extent and locations of roof accessories is indicated on the drawings and by provisions of this section.
- B. The types of units specified in this section include the following:
 - 1. Roof Hatches.
- C. Related sections:
 - 1. Refer to roofing system sections of these specifications for roofing accessories (not work of this section).

1.3 QUALITY ASSURANCE:

- A. Roof Hatch Manufacturer: Provide products by one of the following or Architect approved equal:
 - 1. The Bilco Company.
 - 2. Babcock-Davis.
 - 3. J.L. Industries.
 - 4. Nystrom Building Products.
- B. Standards: Except as otherwise indicated, comply with applicable provisions of SMACNA "Architectural Sheet Metal Manual".

1.4 SUBMITTALS:

- A. Product Data; Roof Accessories: Submit manufacturer's product specifications, rough-in diagrams, details, installation instructions and general product recommendations.
- B. Samples; Roof Accessories: Submit two 8 inch square samples of each exposed metal and plastic sheet materials, and two 24 inch long samples of metal formed or extruded exposed member; color and finish as specified.

PART 2 - PRODUCTS

2.1 GENERAL PRODUCT REQUIREMENTS:

- A. Provide manufacturers' standard units, modified as necessary to comply with requirements. Shop fabricate each unit to greatest extent possible.

2.2 MATERIALS, GENERAL:

- A. Zinc-Coated Steel: Commercial quality with 0.20 percent copper, ASTM A 525, G90 hot-dip galvanized, mill phosphatized.
- B. Stainless Steel: AISI Type 302/304, ASTM A 167, 2D annealed finish except as otherwise indicated, temper as required for forming and performance.
- C. Aluminum Sheet: ASTM B 209, alloy 3003, temper as required for forming and performance; AA-C22A41 clear anodized finish, except mill finish prepared for painting where indicated for painting.
- D. Extruded Aluminum: Manufacturer's standard extrusions of sizes and general profiles indicated, alloy 6063-T52; 0.078 inch minimum thicknesses for primary framing and curb member legs, 0.062 inch for secondary legs; AA-C22-A41 clear anodized finish on exposed embers, except as otherwise indicated.
- E. Insulation: manufacturer's standard rigid or semirigid board of glass fiber of thicknesses indicated.
- F. Wood Nailers: Softwood lumber, FR-S pressure treated with waterborne preservatives for above ground use, complying with AWPB LP-2; not less than 1-1/2 inch thick.
- G. Fasteners:
 - 1. Same metal as metals being fastened, or nonmagnetic stainless steel or other noncorrosive metal as recommended by manufacturer. Match finish of exposed fasteners with finish of material being fastened.
 - 2. Where removal of exterior exposed fasteners affords access to building, provide nonremovable fastener heads.
- H. Gaskets: Tubular or fingered design of neoprene or polyvinyl chloride or block design of sponge neoprene.
- I. Bituminous Coating: FS TT-C-494 or SSPC-Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15 mil dry film thickness per coating.
- J. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, nondrying, nonmigrating sealant.
- K. Elastomeric Sealant: Generic type recommended by unit manufacturer, which is compatible with joint surfaces; comply with FS TT-S-0027, TT-S-00230, or TT-S-001543.
- L. Roofing Cement: ASTM D 4586, Type I, asbestos free, asphalt based.

2.3 UNIT MATERIALS, FABRICATION:

A. Roof Hatches:

1. Basis of specification manufacturer and Model (Hatch 1): Bilco, Model "L."
 - a. Size: 48 inches x 48 inches.
 - b. Single leaf cover with continuous hinge.
2. Performance characteristics:
 - a. Cover shall be reinforced to support a minimum live load of 40 psf with a maximum deflection of 1/150th of the span or 20 psf wind uplift.
 - b. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
 - c. Operation of the cover shall not be affected by temperature.
 - d. Entire hatch shall be weathertight with fully welded corner joints on cover and curb.
3. Cover: Select: 14 gauge paint bond G-90 galvanized steel with a 3" beaded flange with formed reinforcing members. Cover shall have a heavy extruded EPDM rubber gasket that is bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.
4. Cover insulation: Shall be fiberglass of 1" thickness, fully covered and protected by a metal liner G-90 galvanized steel.
5. Curb: Shall be 12" in height and of 14 gauge paint bond G-90 galvanized steel. The curb shall be formed with a 3-1/2" flange with 7/16" holes provided for securing to the roof deck. The curb shall be equipped with an integral metal capflashing of the same gauge and material as the curb, fully welded at the corners, that features manufacturer's flashing system to hold single ply roofing membrane securely in place.
6. Curb insulation: Shall be rigid, high-density fiberboard of 1" thickness on outside of curb.
7. Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe through bolted to the curb assembly.
8. Hardware
 - a. Heavy pintle hinges shall be provided
 - b. Cover shall be equipped with an enclosed two point spring latch with interior and exterior turn handles
 - c. Roof hatch shall be equipped with interior and exterior padlock hasps.
 - d. The latch strike shall be a stamped component bolted to the curb assembly.
 - e. Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 1" diameter red vinyl grip handle to permit easy release for closing.

9. Compression spring tubes shall be an anti-corrosive composite material and all other hardware shall be zinc plated and chromate sealed.
10. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.
11. Finishes: Factory finish shall be alkyd based red oxide primed steel.
12. Sloping Roofs: Where slope of roof deck exceeds 1/4 inch per foot, fabricate hatch curbs with height tapered to match slope, to result in level installation of tops of units.
13. Extension pole: Provide manufacturer's built in extension pole to extend above opening upon opening of hatch door.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. General: Comply with manufacturer's instructions and recommendations. Coordinate with installation of roof deck and other substrates to receive accessory units, and with vapor barriers, roof insulation, roofing and flashing; as required to ensure that each element of the work performs properly, and that combined elements are waterproof and weather tight. Anchor units securely to supporting structural substrates, adequate to withstand lateral and thermal stresses as well as inward and outward loading pressures.
- B. Isolation: Where metal surfaces of units are to be installed in contact with noncompatible metal or corrosive substrates, including wood, apply bituminous coating on concealed metal surfaces, or provide other permanent separation.
- C. Flange Seals: Except as otherwise indicated, set flanges of accessory units in a thick bed of roofing cement to form a seal.
- D. Cap Flashing: Where cap flashing is required as component of accessory, install to provide adequate waterproof overlap with roofing or roof flashing (as counter flashing). Seal with thick bead of mastic sealant, except where overlap is indicated to be left open for ventilation.
- E. Operational Units: Test operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

3.2 CLEANING AND PROTECTION:

- A. Clean exposed metal and plastic surfaces in accordance with manufacturer's instructions. Touch up damaged metal coatings.
- B. Installer shall advise Contractor of required procedures for surveillance and protection of roof accessories; so that units will be without damage or deterioration, other than normal weathering, at time of substantial completion.
- C. Clean and polish plastic skylight units, inside and out, not more than 5 days prior to date of substantial completion.

END SECTION 07 72 00

SECTION 07 84 13 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 SUMMARY

- A. This Section includes through-penetration firestop systems for penetrations through the following assemblies, including both empty openings and openings containing penetrating items:

1. Floors.
2. Roofs.
3. Walls and partitions.
4. Construction enclosing compartmentalized areas.

- B. Related Sections include the following:

1. Division 3 Section "Concrete" for construction of openings in concrete slabs and walls.
2. Division 7 Section "Thermal Insulation" for safining insulation and accessories.
3. Divisions 21, 22 and 23 Sections specifying duct and piping penetrations.
4. Divisions 26, 27 and 28 Sections specifying cable and conduit penetrations.

1.3 PERFORMANCE REQUIREMENTS

- A. General: For the following constructions, provide through-penetration firestop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.

1. Fire-resistance-rated load-bearing walls, including partitions, with fire-protection-rated openings.
2. Fire-resistance-rated non-load-bearing walls, including partitions, with fire-protection-rated openings.
3. Floor assemblies.
4. Roof assemblies.

- B. T-Rated Systems: For the following conditions, provide through-penetration firestop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814,

where systems protect penetrating items exposed to potential contact with adjacent materials in occupiable floor areas:

1. Penetrations located outside wall cavities.
 2. Penetrations located in construction containing floor and roof openings.
 3. Penetrating items larger than 4-inch-diameter nominal pipe or 16 square inches in overall cross-sectional area.
- C. For through-penetration firestop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing do not deteriorate when exposed to these conditions both during and after construction.
1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration firestop systems.
 2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide firestop systems capable of supporting floor loads involved either by installing floor plates or by other means.
 3. For penetrations involving insulated piping, provide through-penetration firestop systems not requiring removal of insulation.
- D. For through-penetration firestop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.

1.4 SUBMITTALS

- A. Product Data: For each type of through-penetration firestop system product indicated.
- B. Shop Drawings: For each through-penetration firestop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include firestop design designation of testing agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration firestop system configuration for construction and penetrating items.
 2. Where Project conditions require modification of qualified testing and inspecting agency's illustration to suit a particular through-penetration firestop condition, submit illustration, with modifications marked, approved by through-penetration firestop system manufacturer's fire-protection engineer.
- C. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

- D. Product Certificates: Issued by manufacturers of through-penetration firestop system products certifying that products furnished comply with requirements.
- E. Product Test Reports: From a qualified testing agency indicating through-penetration firestop system complies with requirements, based on comprehensive testing of current products.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed through-penetration firestop systems similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Source Limitations: Obtain through-penetration firestop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide through-penetration firestop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
 - 1. Firestopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL or another agency performing testing and follow-up inspection services for firestop systems acceptable to authorities having jurisdiction.
 - 2. Through-penetration firestop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:
 - a. Through-penetration firestop system products bear classification marking of qualified testing and inspecting agency.
 - b. Through-penetration firestop systems correspond to those indicated by reference to through-penetration firestop system designations listed by the following:
 - 1) UL in "Fire Resistance Directory."
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver through-penetration firestop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.

- B. Store and handle materials for through-penetration firestop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

1.7 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install through-penetration firestop systems when ambient or substrate temperatures are outside limits permitted by through-penetration firestop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration firestop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration firestop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration firestop systems.
- C. Do not cover up through-penetration firestop system installations that will become concealed behind other construction until building or fire inspector (if required by authorities having jurisdiction) has examined each installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. A/D Fire Protection Systems Inc.
 - 2. DAP Inc.
 - 3. Firestop Systems Inc.
 - 4. Hilti Construction Chemicals, Inc.
 - 5. Instant Firestop Mfg. Inc.
 - 6. International Protective Coatings Corp.
 - 7. Isolatek International.
 - 8. Nelson Firestop Products.
 - 9. NUCO Industries.
 - 10. RectorSeal Corporation (The).
 - 11. Specified Technologies Inc.
 - 12. 3M Fire Protection Products.
 - 13. Tremco.

14. United States Gypsum Company.

2.2 FIRESTOPPING, GENERAL

- A. Compatibility: Provide through-penetration firestop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration firestop systems, under conditions of service and application, as demonstrated by through-penetration firestop system manufacturer based on testing and field experience.
- B. Accessories: Provide components for each through-penetration firestop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration firestop system manufacturer and approved by the qualified testing and inspecting agency for firestop systems indicated. Accessories include, but are not limited to, the following items:
 - 1. Permanent forming/damming/backing materials, including the following:
 - a. Slag/Rock-wool-fiber insulation.
 - b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
 - c. Fire-rated form board.
 - d. Fillers for sealants.
 - 2. Temporary forming materials.
 - 3. Substrate primers.
 - 4. Collars.
 - 5. Steel sleeves.

2.3 FILL MATERIALS

- A. General: Provide through-penetration firestop systems containing the types of fill materials appropriate to substrate and designated fire rating by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials.
- B. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- D. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

- E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- F. Intumescent Putties: Nonhardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- H. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
- I. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
- K. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
 - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and nonsag formulation for openings in vertical and other surfaces requiring a nonslumping, gunnable sealant, unless indicated firestop system limits use to nonsag grade for both opening conditions.
 - 2. Grade for Horizontal Surfaces: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces.
 - 3. Grade for Vertical Surfaces: Nonsag formulation for openings in vertical and other surfaces.

2.4 MIXING

- A. For those products requiring mixing before application, comply with through-penetration firestop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration firestop systems to comply with written recommendations of firestop system manufacturer and the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration firestop systems.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration firestop systems. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Priming: Prime substrates where recommended in writing by through-penetration firestop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration firestop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove smears from firestop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

3.3 THROUGH-PENETRATION FIRESTOP SYSTEM INSTALLATION

- A. General: Install through-penetration firestop systems to comply with firestop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
 - 1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of firestop systems.
- C. Install fill materials for firestop systems by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.

3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 FIELD QUALITY CONTROL

- A. Proceed with enclosing through-penetration firestop systems with other construction only after inspection by pertinent authorities has been completed.
- B. Where deficiencies are found, repair or replace through-penetration firestop systems so they comply with requirements.

3.5 IDENTIFICATION

- A. Identify through-penetration firestop systems with pressure-sensitive, self-adhesive, preprinted vinyl labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
 1. The words: "Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage."
 2. Contractor's name, address, and phone number.
 3. Date of installation.
 4. Through-penetration firestop system manufacturer's name.
 5. Installer's name.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration firestop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration firestop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration firestop systems immediately and install new materials to produce through-penetration firestop systems complying with specified requirements.

END OF SECTION 07 84 13

SECTION 07 92 00 - JOINT SEALERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. The applications for joint sealers as work of this section include the following:

1. Control and expansion joints in cast-in-place concrete.
2. Control and expansion joints in unit masonry.
3. Joints between metal panels.
4. Perimeter joints between interior and exterior walls and frames of windows and doors.
5. Flashing and coping joints.
6. Interior wall/ceiling joints.
7. Joints at hollow metal frames and floors.
8. Joints between plumbing fixtures and adjoining walls and floors.
9. Bed joint under thresholds.
10. Perimeter joints of interior and exterior wall penetrations.
11. Joints between glass mat gypsum sheathing, and over fasteners.
12. Joints in wet seal metal plate wall systems.
13. Joints between differing materials.

- B. Related Sections:

1. Division 4 Section "Unit Masonry" for masonry control and expansion joint fillers and gaskets.
2. Division 7 Section "Fire Resistive Joint Systems."
3. Division 7 Section "Penetration Firestopping."
4. Division 8 Section "Glass and Glazing" for glazing sealants.
5. Division 9 Section "Gypsum Board" for sealing perimeter joints of gypsum board partitions to reduce sound transmission.

1.3 SUBMITTALS:

- A. Product Data: Submit manufacturer's product specifications, handling / installation / curing instructions, and performance tested data sheets for each elastomeric product required. Submit color chart showing full line of color choices.

1.4 JOB CONDITIONS:

- A. Weather Conditions: Do not proceed with installation of liquid sealants under unfavorable weather conditions. Install elastomeric sealants when temperature is in lower third of temperature range recommended by manufacturer for installation.

1.5 GUARANTEE:

- A. Submit 2 copies of written 2 year guarantee agreeing to repair or replace joint sealers which fail to perform as airtight and watertight joints; or fail in joint adhesion, cohesion, abrasion resistance, weather resistance, stain resistance, or general durability; or appear to deteriorate in any other manner. Provide guarantee signed by the installer and contractor. Provide with copies with product submittals for review by Architect and for final inclusion in O&M Manuals.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. General Sealer Performance Requirements: Provide colors indicated or, if not otherwise indicated, as selected by Architect from manufacturer's extended line of colors. Select materials for compatibility with joint surfaces and other indicated exposures, and except as otherwise indicated select modulus of elasticity and hardness or grade recommended by manufacturer for each application indicated. Where exposed to foot traffic, select marketing materials of sufficient strength and hardness to withstand stiletto heel traffic without damage or deterioration of sealer system.
- B. Colors: To be selected by Architect from manufacturer's standard colors.
- C. Elastomeric Sealants:
 - 1. Two-Component Nonsag Urethane Sealant: (General Exterior)
 - a. Urethane-based, two-part elastomeric sealant, complying with ASTM C 920, Class 25 and Class 50, Type M (multicomponent), Grade NS (nonsag). Uses related to exposure: NT (nontraffic) and T (traffic).
 - b. Available products:
 - 1) Pecora Corporation; Dynatrol II.
 - 2) Schnee-Morehead, Inc.; Permathane SM 7200.
 - 3) Sika Corporation, Inc.; Sikaflex - 2c NS TG.
 - 4) Sonneborn, Division of ChemRex Inc.; NP 2.
 - 5) Tremco; Dymeric 511.
 - 6) Tremco; Vulkem 227.
 - 7) Tremco; Vulkem 922.
 - 8) Tremco; Vulkem 322 DS.
 - 2. One-Component Urethane Sealant: (General Interior)
 - a. Urethane-based one-part elastomeric sealant, complying with ASTM C 920, Class 25 and Class 50, Type S (single component), Grade NS

(nonsag). Uses related to exposure: NT (nontraffic). For joints less than 1/2 inch in width.

b. Available products:

- 1) Bostik Findley; Chem-Calk 900.
- 2) Bostik Findley; Chem-Calk 915.
- 3) Bostik Findley; Chem-Calk 916 Textured.
- 4) Bostik Findley; Chem-Calk 2639.
- 5) Pecora Corporation; Dynatrol I-XL.
- 6) Polymeric Systems Inc.; Flexiprene 1000.
- 7) Polymeric Systems Inc.; PSI-901.
- 8) Schnee-Morehead, Inc.; Permathane SM7100.
- 9) Schnee-Morehead, Inc.; Permathane SM7108.
- 10) Schnee-Morehead, Inc.; Permathane SM7110.
- 11) Sika Corporation, Inc.; Sikaflex - 15LM.
- 12) Tremco; DyMonic.
- 13) Tremco; Vulkem 921.
- 14) Tremco; Vulkem 931.

3. Exterior Silicone Rubber, Neutral Curing and Basic curing Sealant: complying with ASTM C 920, Class 50, Type S (single component), Grade NS (nonsag). Uses related to exposure: NT (nontraffic). For use at EIFS and glass mat gypsum sheathing, metal panel systems.

a. Silicone rubber-based, one-part elastomeric sealant, non-staining sealant recommended by manufacturer for exterior joints.

b. Available products:

- 1) Dow Corning Corporation; 795, non-stain
- 2) GE Silicones; SilPruf NB SCS9000, non-bleed
- 3) Pecora Corporation; 865.

c. Provide nonacid, porous bond type silicone rubber sealant where one or both joint faces are masonry, stone, concrete or other porous materials.

d. Provide acid, nonporous bond type silicone rubber sealant where both joint faces are metal, glass plastic or other nonporous material.

4. Mildew-Resistant Silicone Rubber Sealant:

a. Silicone rubber-based, neutral curing, one-part elastomeric sealant, complying with ASTM C 920, Class 25, Type S (single component), Grade NS (nonsag). Uses related to exposure: NT (nontraffic). Compounded specifically for mildew resistance and recommended by manufacturer for interior joints in wet areas and around plumbing fixtures; passing ANSI A136.1 test for mold growth.

b. Approved products are:

- 1) Dow Corning Corporation; 786 Mildew Resistant.

- 2) GE Silicones; Sanitary SCS1700.
 - 3) Tremco; Tremsil 200 White or Clear.
- C. Nonelastomeric Sealants and Caulking Compounds: (General Interior - non-movement joints; interior door frames, etc.)
1. One-Component Acrylic Sealant:
 - a. Acrylic terpolymer, solvent based, one part, thermo plastic sealant compound; solids not less than 95 percent acrylic; complying with ASTM C 1311 or FS TT-S-00230; recommended by manufacturer for general use as exposed building construction sealant.
 - b. Available products:
 - 1) Bostik Findley; Chem-Calk 600.
 - 2) Pecora Corporation; AC-20+.
 - 3) Schnee-Morehead, Inc.; SM 8200.
 - 4) Sonneborn, Division of ChemRex Inc.; Sonolac.
 - 5) Tremco; Tremflex 834.
- D. Preformed Compressible Foam Sealants: Manufacturer's standard open-cell, flexible foam strip of polyurethane or other weather resistant foam, saturated with butylene or other nondrying liquid sealant/adhesive, to a formulation which will form a paintable watertight joint at 50 percent compression, without staining, migrating, hardening or other performance failure.
- E. Miscellaneous Materials:
1. Joint Primer/Sealer: Provide type of joint primer/sealer recommended by sealant manufacturer for joint surfaces to be primed or sealed.
 2. Bond Breaker Tape: Polyethylene tape or other plastic tape as recommended by sealant manufacturer to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.
 3. Sealant Backer Rod: Compressible rod stock of polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable nonabsorptive material as recommended by sealant manufacturer for compatibility with sealant.
 - a. Sealant backer rods for joints in Exterior Insulation and Finish Systems shall be closed cell materials.

PART 3 - EXECUTION

3.1 MANUFACTURER'S INSTRUCTIONS:

- A. Comply with manufacturer's printed instructions except where more stringent requirements are shown or specified, and except where manufacturer's technical representative directs otherwise.

3.2 JOINT PREPARATION:

- A. Clean joint surfaces immediately before installation of sealant or caulking compound. Remove dirt, insecure coatings, moisture and other substances which could interfere with bond of sealant or caulking compound. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer. Roughen vitreous and glazed joint surfaces as recommended by sealant manufacturer.
- B. Prime or seal joint surfaces where indicated, and where recommended by sealant manufacturer. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.

3.3 INSTALLATION:

- A. Set joint filler units at proper depth or position in joint to coordinate with other work, including installation of bond breakers, backer rods and sealants. Do not leave voids or gaps between ends of joint filler units.
- B. Install sealant backer rod for liquid elastomeric sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for application indicated.
- C. Install bond breaker tape where indicated and where required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.
- D. Employ only proven installation techniques, which will ensure that sealants are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.
- E. Install sealant to depths as shown or, if not shown, as recommended by sealant manufacturer but within the following general limitations, measured at center (thin) section of bead:
 - 1. For normal moving joints sealed with elastomeric sealants but not subject to traffic, fill joints to a depth equal to 50 percent of joint width, but neither more than 1/2 inch deep nor less than 1/4 inch deep.
 - 2. For joints sealed with non-elastomeric sealants and caulking compounds, fill joints to a depth in range of 75 percent to 125 percent of joint width.
- F. Spillage: Do not allow sealants or compounds to overflow or spill onto adjoining surfaces, or to migrate into voids of adjoining surfaces. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.
- G. Recess exposed edges of gaskets and exposed joint fillers slightly behind adjoining surfaces, unless otherwise shown, so that compressed units will not protrude from joints.

3.4 CURE AND PROTECTION:

- A. Cure sealants and caulking compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability. Advise Contractor of procedures required for cure and protection of joint sealers during construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at time of substantial completion.

END SECTION 07 92 00

1 **SECTION 07 92 16 - RIGID JOINT SEALANTS**

2
3 **PART 1 - GENERAL**

4
5 1.1 Applicable provisions of Division 01 shall govern work of this section.

6
7 1.2 SUMMARY

8
9 A. Include all materials, labor, services and incidentals necessary for the completion of this section of
10 work.

11
12 B. Work of this section shall consist of:

13
14 1. Sealants in cast in place concrete floors in designated areas of maintenance building.

15
16 C. Furnish labor, materials, equipment, tools, supervision and incidentals required and as specified to
17 seal the joints between the precast double tees and the joints at the pour strips as detailed on the
18 drawings.

19
20 D. The joints shall be provided as specified under other sections of this specification and as detailed
21 on the drawings.

22
23 1.3 SUBMITTALS

24
25 A. WARRANTY

26
27 1. The system manufacturer shall furnish the Owner with a written single-source
28 performance warranty that the joint sealant system will be free of defects related to deck
29 design, workmanship or material deficiency for a five year period from the date of
30 substantial completion of work provided under this section of the specification. The
31 following problems shall be specifically covered under the warranty:

- 32
33 a. Any adhesive or cohesive failure of the seal.
34 b. Discoloration, crazing or other weathering deficiency of the seal.
35 c. Abrasion or tear failure of the seal resulting from normal traffic use.
36 d. Defective joint installation.
37 e. Joint edge spalling of the concrete.

38
39 2. The system manufacturer shall also furnish the Owner with a written scheduled
40 maintenance warranty that the deck joint sealant system will be water tested and
41 inspected yearly and maintained and/or repaired by the system manufacturer for a five
42 year period extending from the date of substantial completion through the fifth year after
43 the date of substantial completion of the work. The previously mentioned problems shall
44 be specifically covered under the warranty.

45 3. Perform any repair under this warranty at no cost to the Owner.

46 4. The system manufacturer shall submit a detailed warranty consistent with the terms of
47 this specification prior to construction for approval. The approved warranty shall be
48 made part of the contractual agreement and shall represent the sole warranty statement
49 for the project.

50 5. Abrasive maintenance equipment, truck traffic and construction traffic are not normal
51 traffic use and are exempt from the warranty.
52

1 1.4 QUALITY ASSURANCE

2
3 A. JOINT SEALER INSTALLER'S QUALIFICATIONS

- 4
5 1. Floor joint sealant installer shall submit qualification to A/E for approval showing five
6 years experience and a minimum of five locations where he has successfully installed the
7 specified joint sealants. A/E reserves the right to reject any installer with insufficient or
8 improper qualifications.
9

10
11 **PART 2 - PRODUCTS**

12
13 2.1 MATERIALS

14
15 A. JOINT SEALANT

- 16
17 1. Basis of specification product and manufacturer are:
18
19 a. "EUCO KWIKjoint 200" Euclid Chemical Company.
20 b. Color to be selected by Architect from manufacturer's standard offerings.
21
22 2. Products of other manufacturers may be provided subject to compliance with
23 requirements of "General Conditions" Article 10 ' "OR EQUAL" CLAUSE.'
24 3. The deck joint sealant system is directly related to other systems described in Sections 03
25 30 00 and 09 91 00 of this specification. All materials used in each of these sections shall
26 be compatible with each other.
27

28 B. MISCELLANEOUS MATERIALS

- 29
30 1. Primers, bond breakers and miscellaneous materials required to install the deck joint
31 sealant system shall be in strict accordance with the manufacturer's recommendations.
32
33

34 **PART 3 - EXECUTION**

35
36 3.1 PREPARATION

- 37
38 A. Blow, sweep or vacuum the surface assuring a clean, dry, sound substrate.
39
40 B. Check all dimensions to insure sizing is in accordance with the manufacturer's recommendations.
41
42 C. Work shall not proceed until unsatisfactory conditions have been corrected in a manner acceptable
43 to the installer.
44
45 D. Joint edges shall be ground following removal of existing sealant to insure a clean sound joint
46 edge.
47
48 E. Prior to sealing, joints shall be thoroughly cleaned by the sealant subcontractor.
49
50 F. Joints shall be cleaned either by hand or wire brushing, power wire brushing, sand blasting or
51 grinding the edge to assure a clean, sound substrate.
52

53 3.2 APPLICATION

- 54
55 A. Work shall not proceed with the installation of sealants under adverse weather conditions or when
56 temperatures are below or above manufacturer's recommended limitations for installation.

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- B. The joint sealant system manufacturer shall take direct contractual responsibility for installing the sealant system described herein.
- C. Installation procedures shall be in accordance with the system manufacturer's recommendations.
- D. All joints must be carefully and thoroughly primed using prescribed primers.
- E. Use only non-absorbent foam fillers as required such as Neoprene, Ethafoam, Minicel, Bulyl or PVC. Sealants shall not be installed over damp or wet filters.
- F. Sealants shall be mixed and applied to joint with a caulking gun or other method approved by sealant manufacturer. Sealant shall be kept slightly low in the joint to prevent damage from snowplows and other vehicular traffic.

3.3 PROTECTION

- A. Joints shall be protected from water immersion during the initial cure.
- B. The seal shall be protected from traffic until cured.

END SECTION 07 92 16

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SECTION 07 95 00 - EXPANSION CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Applicable provisions of Division 1 shall govern work of this Section.

1.2 SUMMARY

- A. Types of joints for which architectural joint systems are specified include the following:

1. Exterior wall and roof joints.
2. Interior floor, wall and ceiling joints.

- B. Related Sections include the following:

1. Division 3 Section "Cast-in-Place Concrete" for block-outs and cast-in anchorage and frames for architectural joint systems in concrete floors, parking decks, and walls.
2. Division 7 Section "Sheet Metal Flashing and Trim" for sheet metal roof and wall joint systems.
3. Division 7 Section "Joint Sealants" for elastomeric sealants and preformed compressed-foam sealants without metal frames.

1.3 DEFINITIONS

- A. Architectural Joint System: Any filler or cover used to span, fill, cover, or seal a joint, except expanding foam seals and poured or foamed in-place sealants.
- C. Cyclic Movement: Periodic change between widest and narrowest joint widths in an automatically mechanically controlled system.
- D. Fire Barriers: Any material or material combination, when fire tested after cycling, designated to resist passage of flame and hot gases through a movement joint.
- E. Maximum Joint Width: Widest linear gap a joint system tolerates and performs its designed function without damaging its functional capabilities.
- F. Minimum Joint Width: Narrowest linear gap a joint system tolerates and performs its designed function without damaging its functional capabilities.

- G. Movement Capability: Value obtained from the difference between widest and narrowest widths of a joint opening typically expressed in numerical values or a percentage of nominal value of joint width.
- I. Nominal Joint Width: Width of linear gap indicated as representing the conditions existing when architectural joint systems will be installed or, if no nominal joint width is indicated, a width equal to the sum of maximum and minimum joint widths divided by two.

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide factory-fabricated architectural joint systems capable of withstanding the types of loads and of accommodating the kinds of movement, and the other functions for which they are designed including those specified below, without failure. Types of failure include those listed in Appendix X3 of ASTM E 1399.
 - 1. Pedestrian Traffic Joints: Support pedestrian traffic across joint.
 - 2. Exterior Joints: Maintain continuity of weather enclosure.
 - 3. Other Joints: Where indicated, provide joint systems that prevent penetration of water, moisture, and other substances deleterious to building components or content.
 - 4. Joints in Surfaces with Architectural Finishes: Serve as finished architectural joint closures.

1.5 SUBMITTALS

- A. Product Data: Include manufacturer's product specifications, construction details, material and finish descriptions, and dimensions of individual components and seals.
- B. Shop Drawings: For each joint system specified, provide the following:
 - 1. Placement Drawings: Include line diagrams showing entire route of each joint system, plans, elevations, sections, details, joints, splices, locations of joints and splices, and attachments to other Work. Where joint systems change planes, provide Isometric Drawings depicting how components interconnect to achieve continuity of joint covers and fillers.
- C. Samples for Verification: Full-size units 6 inches long of each type of joint system indicated; in sets for each finish, color, texture, and pattern specified, showing the full range of variations expected in these characteristics.
- D. Product Test Reports: From a qualified testing agency indicating architectural joint systems comply with requirements, based on comprehensive testing of current products.
- F. Research/Evaluation Reports: Evidence of architectural joint system's compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

1.6 QUALITY ASSURANCE

- A. Source Limitations: Obtain architectural joint systems through one source from a single manufacturer. Coordinate compatibility with adjoining joint systems specified in other Sections.
- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of architectural joint systems and are based on the specific systems indicated. Other manufacturers' systems complying with requirements may be considered. Refer to Division 1 Section "Product Requirements."
 - 1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Products: The design for each architectural joint system specified in Part 2 "Architectural Joint Systems" Article below is based on the products named. Subject to compliance with requirements, provide either the named products or comparable products by one of the other manufacturers listed.

2.2 MATERIALS

- A. Aluminum: ASTM B 221 (ASTM B 221M), alloy 6063-T5 for extrusions; ASTM B 209 (ASTM B 209M), alloy 6061-T6 for sheet and plate.
 - 1. Apply manufacturer's standard protective coating on aluminum surfaces to be placed in contact with cementitious materials.
- B. Preformed Seals: Single or multicellular extruded elastomeric seals designed with or without continuous, longitudinal, internal baffles. Formed to be installed in frames or with anchored flanges, in color indicated or, if not indicated, as selected by Architect from manufacturer's standard colors.
- C. Strip Seals: Elastomeric membrane or tubular extrusions with a continuous longitudinal internal baffle system throughout complying with ASTM E 1783; used with compatible frames, flanges, and molded-rubber anchor blocks.
- D. Compression Seals: Preformed, elastomeric extrusions having internal baffle system complying with ASTM E 1612 in sizes and profiles indicated or as recommended by manufacturer.
- E. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, flexible moisture barrier and filler materials, drain tubes, lubricants, adhesives, and other

accessories compatible with material in contact, as indicated or required for complete installations.

2.3 ARCHITECTURAL JOINT SYSTEMS

- A. General: Provide joint systems of design, basic profile, materials, and operation indicated. Provide units with the capability to accommodate joint widths indicated and variations in adjacent surfaces.
 - 1. Furnish units in longest practicable lengths to minimize number of end joints. Provide hairline mitered corners where joint changes directions or abuts other materials.
 - 2. Include closure materials and transition pieces, tee-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous joint systems.
 - 3. Frames for Strip Seals: Designed with semiclosed cavity that provides a mechanical lock for seals of type indicated.
 - 4. Public Arena Seals: Non-slip seals designed for installation on treads and risers and to lie flat with adjacent surfaces, and complying with ADA guidelines for public areas.
- B. Products: Provide products as indicated on the drawings for each individual condition based on Construction Specialties, Inc. products "SRJ and SRJW" series of joint and cover systems.
- C. Other manufacturers having products which are acceptable for the Work are as follows:
 - 1. Balco, Inc.
 - 2. InPro Corporation (IPC).
 - 3. MM Systems Corporation.
 - 4. Nystrom, Inc.
 - 5. Other Architect pre-approved equal.

2.4 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

2.5 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 607.1.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Prepare substrates according to architectural joint system manufacturer's written instructions.
- B. Coordinate and furnish anchorages, Placement Drawings, and instructions for installing joint systems to be embedded in or anchored to concrete or to have recesses formed into edges of concrete slab for later placement and grouting-in of frames.
- C. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary to secure joint systems to in-place construction, including threaded fasteners with drilled-in expansion shields for masonry and concrete where anchoring members are not embedded in concrete. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of joint systems.

3.2 INSTALLATION

- A. Comply with manufacturer's written instructions for handling and installing architectural joint assemblies and materials, unless more stringent requirements are indicated.
- B. Coordinate installation of architectural joint assembly materials and associated work so complete assemblies comply with assembly performance requirements.
- C. Terminate exposed ends of exterior architectural joint assemblies with factory-fabricated termination devices to maintain waterproof system.
- D. Install factory-fabricated transitions between building expansion-joint cover assemblies and roof expansion-joint assemblies, specified in Division 7 Section "Roof Expansion Assemblies," to provide continuous, uninterrupted, watertight construction.
- E. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required to install joint systems.
 - 1. Install joint cover assemblies in true alignment and proper relationship to joints and adjoining finished surfaces measured from established lines and levels.
 - 2. Allow adequate free movement for thermal expansion and contraction of metal to avoid buckling.
 - 3. Set covers in horizontal surfaces at elevations that place exposed surfaces flush with adjoining finishes.
 - 4. Locate wall ceiling covers in continuous contact with adjacent surfaces.
 - 5. Securely attach in place with required accessories.
 - 6. Locate anchors at interval recommended by manufacturer, but not less than 3 inches from each end and not more than 24 inches o.c.

- F. Continuity: Maintain continuity of joint systems with a minimum number of end joints and align metal members. Cut and fit ends to produce joints that will accommodate thermal expansion and contraction of metal to avoid buckling of frames. Adhere flexible filler materials, if any, to frames with adhesive or pressure-sensitive tape as recommended by manufacturer.
- G. Extruded Preformed Seals: Install seals to comply with manufacturer's written instructions and with minimum number of end joints.
 - 1. For straight sections, provide preformed seals in continuous lengths.
 - 2. Vulcanize or heat-weld field splice joints in preformed seal material to provide watertight joints using procedures recommended by manufacturer.
 - 3. Apply adhesive, epoxy, or lubricant adhesive approved by manufacturer to both frame interfaces before installing preformed seals.
 - 4. Seal transitions according to manufacturer's written instructions.
 - 5. Install foam seals with adhesive recommended by manufacturer and heat seal all splices.
- H. Joint Systems with Seals: Seal end joints within continuous runs and joints at transitions according to manufacturer's written instructions to provide a watertight installation.

3.3 CLEANING AND PROTECTION

- A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

END OF SECTION 07 95 00

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes the following products manufactured in accordance with SDI recommended standards.

1. Doors: Flush hollow or composite construction for interior and exterior locations.
2. Frames: Pressed steel frames for doors, transoms, sidelights, and other interior and exterior openings.

- B. Related Sections:

1. Division 4 Section "Unit Masonry" for building anchors into and grouting frames in masonry construction.
2. Division 8 Section "Hardware" for door hardware.
3. Division 8 Section "Glass and Glazing" for glass in steel doors and frames.
4. Division 9 Section "Painting" for field painting primed doors and frames.

1.3 QUALITY ASSURANCE:

- A. Doors: Complying with ANSI 250.8 for level and model and ANSI A250.4 for physical endurance level indicated, 1-3/4 inches thick.

1. Interior Doors: Level 2 and Physical Performance Level B (Heavy Duty), Model 1 (Full Flush).
2. Exterior Doors: Full-insulated, Level 2 and Physical Performance Level B (Heavy Duty), Model 2 (Seamless), metallic-coated steel sheet faces.
3. Thermal-Resistance Value: R not less than 6.0 deg F x h x sq. ft./Btu when tested according to ASTM C 1363.
4. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as door face sheets.

- B. Frames: ANSI A250.8; Concealed fastenings unless otherwise indicated.

1. Steel Sheet Thickness: 16-gauge.
2. Fabricate interior frames with mitered or coped and face welded corners.
3. Fabricate exterior frames from metallic-coated steel sheet, with mitered or coped and continuously welded corners.

4. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.
 5. Frame Anchors: Not less than 0.042 inch thick.
- C. Fire Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities have jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252.

1.4 SUBMITTALS:

- A. Product Data: Submit product data for door and frame components.
- B. Submit shop drawings showing following items.
 1. Frames: Corner construction, reinforcing, anchors, finish, materials, hardware locations and profiles.
 2. Doors: Edge construction, cut-out locations, design, reinforcing, materials, finishes and hardware locations.
 3. Shop drawings shall show door and frame schedule using same door/frame reference numbers as those indicated on the drawings and door schedule.

1.5 DELIVERY, STORAGE, AND HANDLING:

- A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage.
- B. Inspect doors and frames on delivery for damage. Minor damages may be repaired provided refinished items match new work and are acceptable to the Architect; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames at building site under cover. Place units on minimum 4-inch high wood blocking. Avoid using nonvented plastic or canvas shelters that could create a humidity chamber. If cardboard wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4 inch spaces between stacked doors to promote air circulation.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Interior Doors/Frames: Commercial quality, cold rolled, stretcher leveled, matte finish steel conforming to ASTM A 366.
- B. Exterior Doors/Frames: Commercial quality, cold rolled, stretcher leveled, steel conforming to ASTM A 366/A 366M; zinc coated (galvanized) to comply with ASTM A 653/A 653M G60 galvanized coating.

2.2 GENERAL:

- A. Fabricate in largest size units permitted by shipping restrictions.

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HOLLOW METAL DOORS AND FRAMES

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- B. Grind exposed welds smooth.
- C. Locate hardware items in accordance with NAAMM Standard CHM-2.
- D. Factory prepare doors and frames for all electrical devices to include but are not limited to wiring channels, electric strikes, position switches, RTE's and electric power transfers.
- E. Mortise, reinforce, drill and tap for templated mortise hardware in accordance with templates furnished by hardware supplier.
- F. Reinforce for all surface mounted hardware.
- G. Reinforce for handed doors as follows: Hinges or Pivots - 7 gage; all other hardware - 12 gage.
- H. Identify all items as to location in project.
- I. Install hardware items requiring factory installation.
- J. Reinforce head of frames over 42 inches wide with 12 gage closer reinforcing sleeve full width of frame.
- K. Secure fire door labels to hinge side of hollow metal items.
- L. Provide labeled frames for all 30 minute or longer labeled doors.
- M. Labels to indicate that temperature rise at end of 30 minutes for A and B labels does not exceed 450 degrees F.

2.3 DOORS:

- A. Interior Doors: ANSI/SDI-100, Grade II, heavy-duty, Model 2, minimum 18-gage cold rolled sheet steel faces.
- B. Exterior Doors: ANSI/SDI-100, Grade III, extra heavy-duty, Model 2, minimum 16-gage galvanized steel faces. Exterior doors and frames are to be fabricated as thermal insulating assemblies and tested in accordance with ASTM C 236 OR ASTM C 976 on fully operable door assemblies. Insulated core to be polyurethane.
- D. Fabricate Clearance as Follows: 1/8 inch at jamb and head; 1/2 inch between bottom of door and finished floor; 1/8 inch between bottom of door and top of threshold.
- E. Bevel lock or latch edge of door 1/8 inch in 2 inches.
- F. Close top of exterior doors with filler channel.
- G. Parallel bevel meeting edge at double egress doors.
- H. V-bevel meeting edge at pairs of doors.

- I. Fabricate glazed openings with minimum 20 gage flush type edge moldings butted at corners and shipped to the job site screwed to the frames with countersunk oval head self-tapping screws maximum 16 inches on center.
- J. Provide astragals as required by label construction consisting of 1-3/4 inch 12 gage astragal full height of door welded on active leaf of exterior pair of doors.
- K. Unless specified elsewhere or noted otherwise, provide astragals as required by label construction consisting of 1-3/4 inch 12 gage astragal full height of door welded on active leaf of exterior pair of doors.
- L. Construct panels above doors same as for doors.

2.4 FRAMES:

- A. Interior Frames: Fabricate of 16-gage cold rolled steel with 14-gage floor anchors welded inside each jamb.
- B. Exterior Frames: Fabricate of 14-gage cold rolled galvanized steel with 14-gage floor anchors welded inside each jamb.
- C. Fabricate with jamb anchors appropriate to wall construction.
- D. Provide 16 gage temporary spreader channel or angle at bottom of frame.
- E. Drill door stops at single interior doors for 3 mutes on strike jamb opposite hinge locations.
- F. Drill head jamb stop at interior door for mutes located 3 inches from center edge of door at pairs or double egress.
- G. Weld 18 gage jamb anchors to inside of frame each side of opening at metal stud walls with 4 anchors for frames to 7 foot-6 inch and one additional for each 2 foot or fraction thereof over 7 foot-6 inch.
- H. Furnish 16 gage corrugated or perforated T-strap jamb anchors spaced 24 inches on center each side of frame in masonry walls.
- I. Weld 26 gage closed metal cover over hardware mortises of frames in masonry walls.
- J. Machine-miter and full weld frame corner joints for invisible face seam.
- K. Where transom bars and mullions occur, fabricate as closed tubular construction. Join members to jamb or head frame and secure with butt welded joints reinforced with concealed clip angles.
- L. Provide 20 gage closed box with hole for conduit connector at all electric hinge mortises.

2.5 FINISHES:

- A. Clean metal to insure primer adhesion.

- B. Prime paint metal with rust inhibitive paint compatible with finish coat of paint. Refer to Section 09 91 00 for type of paint for finish coat to be applied.
- C. Touch up areas where zinc coating is burned off by welding with zinc rich paint prior to applying prime paint.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Set frames in proper location and level the header. Shim under jamb if necessary. Secure each jamb to floor at jamb anchors with two anchors.
- B. Brace frame to floor or shore to structure above. Plumb and square frame.
- C. At masonry walls, fabricate a wood spreader 1/2 inch narrower than frame and square to fit between jambs at head. Use spreader to locate jambs at floor and to maintain width at midpoint of opening.
- D. Fill all screw and anchor heads with auto body compound and finish smooth.
- E. Touch up all screw heads, welds and abrasions with primer same as applied at the factory prior to finish painting.
- F. Set frames with field splices to a hairline joint.
- G. Weld all joints to adjacent members on multiple openings.
- H. Remove protective plastic wrappings from prefinished items.

END SECTION 08 11 13

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SECTION 08 31 13 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This Section includes the following types of access doors:

- 1. Wall access doors.
- 2. Ceiling access doors.

- B. Related Sections:

- 1. Division 9 Section "Gypsum Drywall" for gypsum board walls and ceilings.
- 2. Division 9 Section "Acoustical Ceilings" for suspended acoustical ceiling systems.
- 3. Division 9 Section "Painting" for finish painting of access doors and frames.

1.3 QUALITY ASSURANCE:

- A. Size Variations: Obtain Architect's acceptance of manufacturer's standard size units which may vary slightly from sizes indicated.

1.4 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical data and installation instructions for each type of access door assembly, including setting drawings, templates, instructions and directions for installation of anchorage devices.
- B. Shop Drawings: Submit shop drawings for fabrication and installation of customized access doors and frames, including details of each frame type, elevations of door design types, anchorage and accessory items.

1.5 COORDINATION:

- A. Furnish inserts and anchoring devices which must be built into other work for installation of access doors. Coordinate delivery with other work to avoid delay.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Provide access doors by one of the following:
 - 1. Cesco Products.
 - 2. J.L. Industries.
 - 3. Karp Associates, Inc.
 - 4. Milcor Div.; Inryco, Inc.
 - 5. Nystrom, Inc.
 - 6. The Williams Bros. Corporation of America.

2.2 MATERIALS:

- A. Steel Sheet: ASTM A 366/A 366M commercial quality, cold rolled steel sheet with baked-on rust-inhibitive primer.

2.3 ACCESS DOORS:

- A. General: Furnish each access door assembly manufactured as an integral unit, complete with all parts and ready for installation.
- B. Steel Access Doors and Frames: Fabricate units of continuous welded steel construction, unless otherwise indicated. Grind welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of support shown.
- C. Flush Access Door with Exposed Trim/Frame:
 - 1. Units consisting of frame with exposed trim, door, hardware, and complying with the following requirements:
 - a. Frame: 0.0598-inch (16 gage) thick steel sheet.
 - b. Door: 0.0747-inch (14 gage) thick steel sheet.
 - c. Trim: Flange integral with frame, 3/4-inch wide, overlapping surrounding finished surface.
 - d. Hinges: Continuous type.
 - e. Locks/Latches: Flush, screwdriver-operated cam. Provide manufacturer's standard number of latches based upon access door size indicated on drawings.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Installer must examine areas and conditions under which access doors are to be installed and must notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION:

- A. Comply with manufacturer's instructions for installation of access doors.

- B. Coordinate installation with work of other trades. Building in of anchors and grouting of frames is included in Division 4 Sections of these specifications.
- C. Set frames accurately in position and securely attach to supports with face panels plumb or level in relation to adjacent finish surfaces.

3.3 ADJUST AND CLEAN:

- A. Adjust hardware and panels after installation for proper operation.
- B. Remove and replace panels or frames which are warped, bowed or otherwise damaged.

END SECTION 08 31 13

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SECTION 08 33 13 - COILING COUNTER DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Counter doors.
- B. Related Requirements:
 - 1. Section 05 50 00 "Metal Fabrications" for miscellaneous steel supports.
 - 2. Section 05 58 00 "Formed Metal Fabrications" for counter tops.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type and size of coiling counter door and accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
 - 2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
- B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
 - 1. Include plans, elevations, sections, and mounting details.
 - 2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
 - 3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
- C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.
 - 1. Include similar Samples of accessories involving color selection.
- D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:

1. Curtain slats.
2. Bottom bar.
3. Guides.
4. Brackets.
5. Hood.
6. Locking device.
7. Include similar Samples of accessories involving color selection.

1.4 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For coiling counter doors to include in maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

- A. Source Limitations: Obtain coiling counter doors from single source from single manufacturer.
 1. Obtain operators and controls from coiling counter door manufacturer.

2.2 COUNTER DOOR ASSEMBLY

- A. Counter Door: Coiling counter door formed with curtain of interlocking metal slats.
 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ACME Rolling Doors.
 - b. Alpine Overhead Doors, Inc.
 - c. Alumatec Pacific Products.
 - d. Amarr Garage Doors.
 - e. C.H.I. Overhead Doors.
 - f. City-Gates.
 - g. Clopay Building Products.
 - h. Cookson Company.
 - i. Cornell Iron Works, Inc.
 - j. Lawrence Roll-Up Doors, Inc.
 - k. McKeon Rolling Steel Door Company, Inc.
 - l. Metro Door.
 - m. Overhead Door Corporation.
 - n. QMI Security Solutions.

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COILING COUNTER DOORS

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- o. Raynor.
 - p. Wayne-Dalton Corp.
- B. Operation Cycles: Door components and operators capable of operating for not less than 10,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
- 1. Include tamperproof cycle counter.
- C. Door Curtain Material: Stainless Steel.
- D. Door Curtain Slats: Flat profile slats of 1-1/2-inch center-to-center height.
- E. Bottom Bar: Manufacturer's standard continuous channel or tubular shape, fabricated stainless steel and finished to match door.
- F. Curtain Jamb Guides: Stainless steel with exposed finish matching curtain slats. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise.
- G. Hood: Stainless steel.
- 1. Shape: Round.
 - 2. Mounting: Face of wall.
- H. Integral Frame, Hood, and Fascia: Galvanized steel.
- 1. Mounting: Face of wall.
- I. Sill Configuration: No sill, counter top by others.
- J. Locking Devices: Equip door with locking device assembly.
- 1. Locking Device Assembly: Single-jamb side locking bars, operable from inside with thumb turn outside with cylinder.
- K. Manual Door Operator: Manufacturer's standard crank operator.
- 1. Provide operator with manufacturer's standard removable operating arm.
- L. Door Finish:
- 1. Steel Finish: Manufacturer's standard baked enamel.
 - 2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.
 - 3. Color: To be selected by Architect from manufacturer's standard offerings.

2.3 DOOR CURTAIN MATERIALS AND CONSTRUCTION

- A. Door Curtains: Fabricate coiling counter-door curtain of interlocking metal slats in a continuous length for width of door without splices. Unless otherwise indicated, provide

slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

1. Stainless-Steel Door Curtain Slats: ASTM A 666, Type 304; sheet thickness of 0.025 inch; and as required.
 2. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face.
- B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain.

2.4 HOODS

- A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.
1. Stainless Steel: 0.025-inch-thick stainless-steel sheet, Type 304, complying with ASTM A 666.

2.5 LOCKING DEVICES

- A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
1. Lock Cylinders: Cylinders Specified and provided in Section 08 70 00 "Door Hardware".

2.6 MANUAL DOOR OPERATORS

- A. General: Equip door with manual door operator by door manufacturer.
- B. Crank Operator: Consisting of crank and crank gearbox, steel crank drive shaft, and gear-reduction unit, of type indicated. Size gears to require not more than 25-lbf force to turn crank. Fabricate gearbox to be oil tight and to completely enclose operating mechanism. Provide manufacturer's standard crank-locking device.

2.7 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.8 STAINLESS STEEL FINISHES

- A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
 - 1. Run grain of directional finishes with long dimension of each piece.
 - 2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
 - 3. Directional Satin Finish: No. 4.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install coiling counter doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.
- B. Install coiling counter doors, hoods, controls, and operators at the mounting locations indicated for each door.

3.3 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
 - 1. Perform installation and startup checks according to manufacturer's written instructions.
 - 2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

- A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
- B. Lubricate bearings and sliding parts as recommended by manufacturer.
- C. Adjust seals to provide tight fit around entire perimeter.

3.5 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of coiling-door Installer.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain coiling counter doors.

END SECTION 08 33 13

1 **SECTION 08 36 13 - SECTIONAL OVERHEAD DOORS**
2
3

4 **PART 1 - GENERAL**
5

6 1.1 RELATED DOCUMENTS
7

- 8 A. Drawings and general provisions of the Contract, including General and Supplementary
9 Conditions and Division 01 Specification Sections, apply to this Section.
10

11 1.2 SUMMARY
12

- 13 A. Section includes manually and electrically operated, insulated and un-insulated sectional
14 doors.
15

16 B. Related Requirements:
17

- 18 1. Section 05 50 00 "Metal Fabrications" for miscellaneous steel supports.
19

20 1.3 ACTION SUBMITTALS
21

22 A. Product Data: For each type and size of sectional door and accessory.
23

- 24 1. Include construction details, material descriptions, dimensions of individual
25 components, profile door sections, and finishes.
26 2. Include rated capacities, operating characteristics, electrical characteristics, and
27 furnished accessories.
28

29 B. Shop Drawings: For each installation and for special components not dimensioned or
30 detailed in manufacturer's product data.
31

- 32 1. Include plans, elevations, sections, and mounting details.
33 2. Include details of equipment assemblies. Indicate dimensions, required
34 clearances, method of field assembly, components, and location and size of each
35 field connection.
36 3. Include points of attachment and their corresponding static and dynamic loads
37 imposed on structure.
38 4. Include diagrams for power, signal, and control wiring.
39

40 C. Samples for Initial Selection: For units with factory-applied finishes.
41

- 42 1. Include Samples of accessories involving color selection.
43

44 D. Samples for Verification: For each type of exposed finish on the following components,
45 in manufacturer's standard sizes:
46

1 1. Flat door sections with sensor edge on bottom section.

2
3 1.4 CLOSEOUT SUBMITTALS

4
5 A. Maintenance Data: For sectional doors to include in maintenance manuals.

6
7 1.5 QUALITY ASSURANCE

8
9 A. Installer Qualifications: An entity that employs installers and supervisors who are trained
10 and approved by manufacturer for both installation and maintenance of units required for
11 this Project.

12
13 1.6 WARRANTY

14
15 A. Special Warranty: Manufacturer agrees to repair or replace components of sectional
16 doors that fail in materials or workmanship within specified warranty period.

17
18 1. Failures include, but are not limited to, the following:

- 19
20 a. Structural failures including, but not limited to, excessive deflection.
21 b. Failure of components or operators before reaching required number of
22 operation cycles.
23 c. Faulty operation of hardware.
24 d. Deterioration of metals, metal finishes, and other materials beyond
25 normal weathering and use; rust through.
26 e. Delamination of exterior or interior facing materials.

27
28 2. Warranty Period: Two years from date of Substantial Completion.

29
30 B. Special Finish Warranty: Manufacturer agrees to repair or replace components that show
31 evidence of deterioration of factory-applied finishes within specified warranty period.

32
33 1. Warranty Period: 10 years from date of Substantial Completion.

34
35
36 **PART 2 - PRODUCTS**

37
38 2.1 MANUFACTURERS, GENERAL

39
40 A. Source Limitations: Obtain sectional doors from single source from single manufacturer.

41
42 1. Obtain operators and controls from sectional door manufacturer.

43
44 2.2 PERFORMANCE REQUIREMENTS

45
46 A. General Performance: Sectional doors shall comply with performance requirements
47 specified without failure due to defective manufacture, fabrication, installation, or other
48 defects in construction.

49
50 B. Structural Performance, Exterior Doors: Capable of withstanding the design wind loads.

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1. Design Wind Load: Uniform pressure (velocity pressure) of 20 lbf/sq. ft., acting inward and outward.
 2. Testing: According to ASTM E 330.
 3. Deflection Limits: Design sectional doors to withstand design wind loads without evidencing permanent deformation or disengagement of door components.
 - a. Deflection of door sections in horizontal position (open) shall not exceed 1/120 of the door width.
 - b. Deflection of horizontal track assembly shall not exceed 1/240 of the door height.
 4. Operability under Wind Load: Design overhead coiling doors to remain operable under uniform pressure (velocity pressure) of 20 lbf/sq. ft. wind load, acting inward and outward.
- C. Windborne-Debris Impact Resistance: Provide glazed sectional doors that pass missile-impact and cyclic-pressure tests according to ASTM E 1996 for Wind Zone 1.

2.3 DOOR ASSEMBLIES:

- A. Overhead door types in project:
1. Electrically operated insulated overhead door with vision ports (OHD-1).
 2. Manually operated insulated overhead doors (OHD-2).
 3. Electrically operated insulated overhead doors (OHD-3).
 4. Manually operated un-insulated overhead doors (OHD-4).
 5. Electrically operated un-insulated overhead doors (OHD-5).
- B. Steel Sectional Door: Sectional door formed with hinged sections and fabricated according to DASMA 102 unless otherwise indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arm-R-Lite.
 - b. C.H.I. Overhead Doors, Inc.
 - c. Clopay Building Products.
 - d. Overhead Door Corporation.
 - e. Raynor.
 - f. Rite-Hite Corporation.
 - g. Wayne-Dalton Corp.
 - h. Windsor Door.
- C. Operation Cycles: Door components and operators capable of operating for not less than 10,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

- 1 D. Air Infiltration: Maximum rate of 0.08 cfm/sq. ft. at 15 and 25 mph when tested
2 according to ASTM E 283.
3
- 4 E. R-Value: 17.5 deg F x h x sq. ft./Btu.
5
- 6 F. Steel Sections: Zinc-coated (galvanized) steel sheet with G90 zinc coating.
7
- 8 1. Section Thickness: 2 inches.
9 2. Exterior-Face, Steel Sheet Thickness: 0.019-inch- nominal coated thickness.
10
11 a. Surface: Manufacturer's standard, grooved.
12
- 13 3. Insulation: Board or Foamed in place.
14 4. Interior Facing Material: Zinc-coated (galvanized) steel sheet with a nominal
15 coated thickness of manufacturer's recommended dimension to comply with
16 performance requirements.
17 5. Interior Facing Material: manufacturer's standard metal material.
18
- 19 G. Track Configuration: Vertical-lift track.
20
- 21 H. Weatherseals: Fitted to bottom and top and around entire perimeter of door. Provide
22 combination bottom weatherseal and sensor edge.
23
- 24 I. Windows where indicated on drawings: Approximately 24 by 7 inches and spaced apart
25 the approximate distance as indicated on Drawings; in row(s) at height indicated on
26 Drawings; installed with glazing of the following type:
27
- 28 1. Insulating Glass: Manufacturer's standard.
29
- 30 J. Roller-Tire Material: Case-hardened steel.
31
- 32 K. Locking Devices for manual doors: Equip door with locking device assembly.
33
- 34 1. Locking Device Assembly: Single-jamb side locking bars, operable from inside
35 with thumbturn outside with cylinder. Cylinder for lock by 08 70 00.
36
- 37 L. Counterbalance Type for manual doors: Torsion spring.
38
- 39 M. Manual Door Operator: Chain-hoist operator.
40
- 41 N. Electric Door Operator where indicated:
42
- 43 1. Usage Classification: Standard duty, up to 25 cycles per hour and up to 90 cycles
44 per day.
45 2. Operator Type: Manufacturer's standard for door requirements.
46 3. Safety: Listed according to UL 325 by a qualified testing agency for commercial
47 or industrial use; moving parts of operator enclosed or guarded if exposed and
48 mounted at 8 feet or lower.
49 4. Motor Exposure: Interior, clean, and dry.
50 5. Emergency Manual Operation: Chain type.

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SECTIONAL OVERHEAD DOORS

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6. Obstruction-Detection Device: Automatic electric sensor edge on bottom section; self-monitoring type.

a. Sensor Edge Bulb Color: Black.

7. Control Station: Interior-side mounted.

O. Door Finish:

1. Baked-Enamel or Powder-Coat Finish: Color and gloss as selected by Architect from manufacturer's full range.

2. Finish of Interior Facing Material: Match finish of exterior section face.

2.4 MATERIALS, GENERAL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.5 STEEL DOOR SECTIONS

A. Exterior Section Faces and Frames: Zinc-coated (galvanized), cold-rolled, commercial steel (CS) sheet, complying with ASTM A 653/A 653M, with indicated zinc coating and thickness.

1. Fabricate section faces from single sheets to provide sections not more than 24 inches high and of indicated thickness. Roll horizontal meeting edges to a continuous, interlocking, keyed, rabbeted, shiplap, or tongue-in-groove weather-resistant seal, with a reinforcing flange return.

2. For insulated doors, provide sections with continuous thermal-break construction, separating the exterior and interior faces of door.

B. Section Ends and Intermediate Stiles: Enclose open ends of sections with channel end stiles formed from galvanized-steel sheet not less than 0.064-inch- nominal coated thickness and welded to door section. Provide intermediate stiles formed from not less than 0.064-inch- thick galvanized-steel sheet, cut to door section profile, and welded in place. Space stiles not more than 48 inches apart.

C. Reinforce bottom section with a continuous channel or angle conforming to bottom-section profile.

D. Reinforce sections with continuous horizontal and diagonal reinforcement, as required to stiffen door and for wind loading. Provide galvanized-steel bars, struts, trusses, or strip steel, formed to depth and bolted or welded in place. Ensure that reinforcement does not obstruct vision lites.

E. Provide reinforcement for hardware attachment.

- 1 F. Board Thermal Insulation: Insulate interior of steel sections with door manufacturer's
2 standard polystyrene or polyurethane board insulation, with maximum flame-spread and
3 smoke-developed indexes of 75 and 450, respectively, according to ASTM E 84; or with
4 glass-fiber-board insulation. Secure insulation to exterior face sheet. Enclose insulation
5 completely within steel sections and the interior facing material, with no exposed
6 insulation.
7
- 8 G. Foamed-in-Place Thermal Insulation: Insulate interior of steel sections with door
9 manufacturer's standard polyurethane insulation, foamed in place to completely fill
10 interior of section and pressure bonded to face sheets to prevent delamination under wind
11 load, and with maximum flame-spread and smoke-developed indexes of 75 and 450,
12 respectively, according to ASTM E 84. Enclose insulation completely within steel
13 sections and the interior facing material, with no exposed insulation.
14
- 15 H. Interior Facing Material: Zinc-coated (galvanized), cold-rolled, commercial steel (CS)
16 sheet, complying with ASTM A 653/A 653M, with indicated thickness.
17
- 18 I. Fabricate sections so finished door assembly is rigid and aligned, with tight hairline joints
19 and free of warp, twist, and deformation.
20

21 2.6 TRACKS, SUPPORTS, AND ACCESSORIES

22

- 23 A. Tracks: Manufacturer's standard, galvanized-steel track system of configuration
24 indicated, sized for door size and weight, designed for lift type indicated and clearances
25 indicated on Drawings, Provide complete system including brackets, bracing, and
26 reinforcement to ensure rigid support of ball-bearing roller guides for required door type,
27 size, weight, and loading.
28
- 29 1. Galvanized Steel: ASTM A 653/A 653M, minimum G60 zinc coating.
 - 30 2. Slope tracks at an angle from vertical or design tracks to ensure tight closure at
31 jambs when door unit is closed.
 - 32 3. Track Reinforcement and Supports: Galvanized-steel members to support track
33 without sag, sway, and vibration during opening and closing of doors. Slot
34 vertical sections of track spaced 2 inches apart for door-drop safety device.
35
- 36 a. For Vertical Track: Intermittent, jamb brackets attached to track and
37 attached to wall.
38
- 39 B. Weatherseals: Replaceable, adjustable, continuous, compressible weather-stripping
40 gaskets of flexible vinyl, rubber, or neoprene fitted to bottom and top of sectional door
41 unless otherwise indicated.
42
- 43 C. Windows: Manufacturer's standard window units of type, size, and in arrangement
44 indicated. Set glazing in vinyl, rubber, or neoprene glazing channel for metal-framed
45 doors and elastic glazing compound for wood doors, as required. Provide removable
46 stops of same material as door-section frames.
47

48 2.7 HARDWARE

49

- 1 A. General: Heavy-duty, corrosion-resistant hardware, with hot-dip galvanized, stainless-
2 steel, or other corrosion-resistant fasteners, to suit door type.
3
4 B. Hinges: Heavy-duty, galvanized-steel hinges of not less than 0.079-inch- nominal coated
5 thickness at each end stile and at each intermediate stile, according to manufacturer's
6 written recommendations for door size. Attach hinges to door sections through stiles and
7 rails with bolts and lock nuts or lock washers and nuts. Use rivets or self-tapping
8 fasteners where access to nuts is impossible. Provide double-end hinges where required,
9 for doors more than 16 feet wide unless otherwise recommended by door manufacturer.
10
11 C. Rollers: Heavy-duty rollers with steel ball-bearings in case-hardened steel races,
12 mounted with varying projections to suit slope of track. Extend roller shaft through both
13 hinges where double hinges are required. Provide 3-inch- diameter roller tires for 3-inch-
14 wide track and 2-inch- diameter roller tires for 2-inch- wide track.
15

16 2.8 LOCKING DEVICES

- 17
18 A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded deadbolt,
19 operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
20
21 1. Lock Cylinders: Cylinders specified in Section 08 70 00 "Door Hardware"
22 standard with manufacturer, provided by 08 70 00 supplier and keyed to building
23 keying system.
24
25 B. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to
26 disengage power supply when door is locked.
27

28 2.9 COUNTERBALANCE MECHANISM

- 29
30 A. Torsion Spring: Counterbalance mechanism consisting of adjustable-tension torsion
31 springs fabricated from steel-spring wire complying with ASTM A 229/A 229M,
32 mounted on torsion shaft made of steel tube or solid steel. Provide springs designed for
33 number of operation cycles indicated.
34
35 B. Cable Drums and Shaft for Doors: Cast-aluminum or gray-iron casting cable drums
36 mounted on torsion shaft and grooved to receive door-lifting cables as door is raised.
37 Mount counterbalance mechanism with manufacturer's standard ball-bearing brackets at
38 each end of torsion shaft. Provide one additional midpoint bracket for shafts up to 16 feet
39 long and two additional brackets at one-third points to support shafts more than 16 feet
40 long unless closer spacing is recommended by door manufacturer.
41
42 C. Cables: Galvanized-steel, multistrand, lifting cables with cable safety factor of at least 5
43 to 1.
44
45 D. Cable Safety Device: Include a spring-loaded steel or spring-loaded bronze cam mounted
46 to bottom door roller assembly on each side and designed to automatically stop door if
47 either lifting cable breaks.
48
49 E. Bracket: Provide anchor support bracket as required to connect stationary end of spring
50 to the wall and to level the shaft and prevent sag.

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SECTIONAL OVERHEAD DOORS

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- 1
2 F. Bumper: Provide spring bumper at each horizontal track to cushion door at end of
3 opening operation.
4

5 2.10 MANUAL DOOR OPERATORS
6

- 7 A. General: Equip door with manual door operator by door manufacturer.
8
9 B. Chain-Hoist Operator: Consisting of endless steel hand chain, chain-pocket wheel and
10 guard, and gear-reduction unit with a maximum 25-lbf force for door operation. Provide
11 alloy-steel hand chain with chain holder secured to operator guide.
12

13 2.11 ELECTRIC DOOR OPERATORS
14

- 15 A. General: Electric door operator assembly of size and capacity recommended and
16 provided by door manufacturer for door and "operation cycles" requirement specified,
17 with electric motor and factory-prewired motor controls, starter, gear-reduction unit,
18 solenoid-operated brake, clutch, control stations, control devices, integral gearing for
19 locking door, and accessories required for proper operation.
20

- 21 1. Comply with NFPA 70.
22 2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and
23 NEMA ICS 6; with NFPA 70, Class 2 control circuit, maximum 24-V ac or dc.
24

- 25 B. Usage Classification: Electric operator and components capable of operating for not less
26 than number of cycles per hour indicated for each door.
27

- 28 C. Door-Operator Type: Unit consisting of electric motor, gears, pulleys, belts, sprockets,
29 chains, and controls needed to operate door and meet required usage classification.
30

- 31 1. Trolley: Trolley operator mounted to ceiling above and to rear of door in raised
32 position and directly connected to door with drawbar.
33 2. Jackshaft, Center Mounted: Jackshaft operator mounted on the inside front wall
34 above door and connected to torsion shaft with an adjustable coupling or drive
35 chain.
36 3. Jackshaft, Side Mounted: Jackshaft operator mounted on the inside front wall on
37 right or left side of door and connected to torsion shaft with an adjustable
38 coupling or drive chain.
39

- 40 D. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure
41 indicated.
42

- 43 1. Electrical Characteristics for OHD-1:
44
45 a. Phase: Single phase.
46 b. Volts: 115 V.
47 c. Hertz: 60.
48
49 2. Electrical Characteristics for OHD-3 & OHD-5:
50

- 1 a. Phase: Polyphase.
- 2 b. Volts: 208 V.
- 3 c. Hertz: 60.
- 4
- 5 3. Motor Size: Minimum size as indicated. If not indicated, large enough to start,
- 6 accelerate, and operate door in either direction from any position, at a speed not
- 7 less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate
- 8 ratings or service factor.
- 9 4. Operating Controls, Controllers (Disconnect Switches), Wiring Devices, and
- 10 Wiring: Manufacturer's standard unless otherwise indicated.
- 11 5. Coordinate wiring requirements and electrical characteristics of motors and other
- 12 electrical devices with building electrical system and each location where
- 13 installed.
- 14 6. Use adjustable motor-mounting bases for belt-driven operators.
- 15
- 16 E. Limit Switches: Equip motorized door with adjustable switches interlocked with motor
- 17 controls and set to automatically stop door at fully opened and fully closed positions.
- 18
- 19 F. Obstruction Detection Device: External entrapment protection consisting of indicated
- 20 automatic safety sensor capable of protecting full width of door opening. Activation of
- 21 device immediately stops and reverses downward door travel.
- 22
- 23 1. Electric Sensor Edge: Automatic safety sensor edge, located within astragal or
- 24 weather stripping mounted to bottom section. Contact with sensor activates
- 25 device. Connect to control circuit using manufacturer's standard take-up reel or
- 26 self-coiling cable.
- 27
- 28 a. Self-Monitoring Type: Four-wire configured device designed to
- 29 interface with door-operator control circuit to detect damage to or
- 30 disconnection of sensor edge.
- 31
- 32 G. Control Station: Three-button control station in fixed location with momentary-contact
- 33 push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure,
- 34 push-button control labeled "Close."
- 35
- 36 1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with
- 37 general-purpose NEMA ICS 6, Type 1 enclosure.
- 38
- 39 H. Emergency Manual Operation: Equip electrically powered door with capability for
- 40 emergency manual operation. Design manual mechanism so required force for door
- 41 operation does not exceed 25 lbf.
- 42
- 43 I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect
- 44 mechanism for automatically engaging manual operator and releasing brake for
- 45 emergency manual operation while disconnecting motor without affecting timing of limit
- 46 switch. Mount mechanism so it is accessible from floor level. Include interlock device
- 47 to automatically prevent motor from operating when emergency operator is engaged.
- 48
- 49 J. Motor Removal: Design operator so motor may be removed without disturbing limit-
- 50 switch adjustment and without affecting emergency manual operation.

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SECTIONAL OVERHEAD DOORS

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1
2 2.12 GENERAL FINISH REQUIREMENTS
3

- 4 A. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal
5 Products (AMP 500-06)" for recommendations for applying and designating finishes.
6
7 B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable.
8 Variations in appearance of adjoining components are acceptable if they are within the
9 range of approved Samples and are assembled or installed to minimize contrast.
10
11 C. Baked-Enamel or Powder-Coat Finish: AAMA 2603. Comply with coating
12 manufacturer's written instructions for cleaning, conversion coating, application, and
13 baking.
14

15 2.13 STEEL AND GALVANIZED-STEEL FINISHES
16

- 17 A. Factory Prime Finish: Manufacturer's standard primer, compatible with field-applied
18 finish. Comply with coating manufacturer's written instructions for cleaning,
19 pretreatment, application, and minimum dry film thickness.
20
21 B. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish
22 consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's
23 written instructions for cleaning, pretreatment, application, and minimum dry film
24 thickness.
25

26
27 **PART 3 - EXECUTION**
28

29 3.1 EXAMINATION
30

- 31 A. Examine substrates, areas, and conditions, with Installer present, for compliance with
32 requirements for substrate construction and other conditions affecting performance of the
33 Work.
34
35 B. Examine locations of electrical connections.
36
37 C. Proceed with installation only after unsatisfactory conditions have been corrected.
38

39 3.2 INSTALLATION
40

- 41 A. Install sectional doors and operating equipment complete with necessary hardware,
42 anchors, inserts, hangers, and equipment supports; according to manufacturer's written
43 instructions and as specified.
44
45 B. Tracks:
46
47 1. Fasten vertical track assembly to opening jambs and framing, spaced not more
48 than 24 inches apart.
49

- 1 C. Accessibility: Install sectional doors, switches, and controls along accessible routes in
2 compliance with regulatory requirements for accessibility.
3

4 3.3 STARTUP SERVICES
5

- 6 A. Engage a factory-authorized service representative to perform startup service.
7
8 1. Complete installation and startup checks according to manufacturer's written
9 instructions.
10 2. Test and adjust controls and safety devices. Replace damaged and
11 malfunctioning controls and equipment.
12

13 3.4 ADJUSTING
14

- 15 A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free
16 of warp, twist, or distortion.
17
18 B. Lubricate bearings and sliding parts as recommended by manufacturer.
19
20 C. Adjust doors and seals to provide weather-resistant fit around entire perimeter.
21
22 D. Touch-up Painting: Immediately after welding galvanized materials, clean welds and
23 abraded galvanized surfaces and repair galvanizing to comply with
24 ASTM A 780/A 780M.
25

26 3.5 DEMONSTRATION
27

- 28 A. Engage a factory-authorized service representative to train Owner's maintenance
29 personnel to adjust, operate, and maintain sectional doors.
30
31

32 END SECTION 08 36 13

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1 **SECTION 08 41 13 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS**

2
3 **PART 1 - GENERAL**

4
5 1.1 RELATED DOCUMENTS:

- 6
7 A. Applicable provisions of Division 1 shall govern work under this Section.
8

9 1.2 DESCRIPTION OF WORK:

- 10
11 A. This section includes the following:

- 12
13 1. Exterior Entrance Doors
14 2. Vestibule Doors Matching Entrance Doors
15 3. Transoms
16 4. Sidelights
17 5. Framing for Entrances
18 6. Hardware Installed in Aluminum-Framed Systems.
19

- 20 B. Related sections:

- 21
22 1. Glazing of Doors & Frames: Refer to another Division 8 section.
23 2. Curtainwall Systems: Refer to another Division 8 section.
24 3. Hardware other than what is specified in this section: Refer to another Division 8
25 section.
26

27 1.3 SUBMITTALS:

- 28
29 A. Product Data: Submit manufacturers standard specifications, details and installation
30 requirements including performance data.
31
32 B. Shop Drawings: Submit drawings showing details and method of anchorage, details of
33 construction, expansion provisions, joints, connections to adjoining work, hardware and
34 finish.
35
36 C. Samples: Submit duplicate samples of material showing finish to be provided. One
37 sample will be retained and one set returned. Where finishes involve normal color and
38 texture variations, include sample sets showing full range of variations expected.
39

40 1.4 SYSTEM DESCRIPTION:

- 41
42 A. Thermal Movement: Fabricate system to provide for expansion and contraction from
43 ambient temperature range of 120 degrees F without buckling, damaging stresses on
44 glazing, failure of joint sealants, damaging loads on fasteners, failure of doors or other
45 operating units to function properly, and other detrimental effects.
46
47 B. Wind Loading: Fabricate system for uniform pressure of 20 psf inward and outward in

1 accordance with ASTM E-330.

2
3 1. Deflection of framing members in direction normal to wall plane is limited to
4 1/175 of clear span or 3/4 inch, whichever is smaller, unless otherwise indicated.

5
6 C. Air Infiltration: Not more than 0.06 cfm per square foot in accordance with ASTM E-
7 283.

8
9 D. Water Infiltration: No uncontrolled water penetration in accordance with ASTM E-331.

10
11 E. Condensation Resistance: Provide a framing system that is thermal-break construction.
12 Units are to be tested for thermal performance in accordance with AAMA 1503 showing
13 condensation resistance factor (CRF) of not less than 45.

14
15 F. Thermal Barriers:

16
17 1. Poured and debridged polyurethane thermal barriers shall be tested as per AAMA
18 TIR A8-90 and AAMA Draft #13 of AAMA's Dry Shrinkage & Composite
19 Performance Thermal Cycling Procedure for validation testing at differential
20 temperatures. At the conclusion of the tests, the shrinkage shall be equal to or
21 less than the prescribed 0.10 percent.

22 2. Use of poured and de-bridged polyurethane thermal beak assemblies will require
23 window manufacturer's prior adoption and continued use of the procedures and
24 quality control features outlined in AAMA's Quality Assurance processing guide
25 For Poured And De-bridged Polyurethane Thermal Barriers.

26
27 G. Thermal Transmittance: Provide framing systems that have an overall U-value of not
28 more than 0.63 BTU/(hr. x Sq. ft. x deg. F) at 15 mph exterior wind velocity when tested
29 in accordance with AAMA 1503.1.

30
31 H. Dead Loads: Provide entrance and storefront system members that do not deflect an
32 amount which will reduce glazing bite below 75 percent of design dimension when
33 carrying full dead load.

34
35 1.5 QUALITY ASSURANCE:

36
37 A. Installer Qualifications: Engage an experienced installer to assume engineering
38 responsibility and perform work of this Section who has specialized in installing entrance
39 and storefront systems similar to those required for this Project and who is acceptable to
40 the manufacturer.

41
42 B. Source Limitations: Obtain each type of entrance and storefront system through one
43 source from a single manufacturer.

44
45 1.6 PROJECT CONDITIONS:

46
47 A. Verify dimensions by field measurements before fabrication and indicate measurements
48 on Shop Drawings.

49
50 B. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

51

1 1.1 WARRANTY:

2
3 A. Provide written warranty, signed by Contractor and installer, agreeing to repair or replace
4 defective materials and workmanship of window wall work (see primary components
5 listing in this section) during 5 year warranty period. "Defective" is defined to include
6 abnormal deterioration/aging/weathering, glass breakage, failure of operational parts to
7 function normally, deterioration or discoloration of finishes, and failure of system to meet
8 performance requirements including structural and infiltration. Repairs or replacements
9 required because of acts of God exceeding performance requirements, vandalism,
10 inadequate maintenance, alterations, failure of structure supporting window wall work or
11 other causes beyond manufacturers/fabricators/ installers/contractor's control, as judged
12 by Architect, shall be completed by contractor/installer and paid for by Owner at
13 reasonable prevailing rates mutually agreed upon at time of such repair/replacement
14 work. Warranty and enforcement shall not deprive Owner of other available actions,
15 rights or remedies.

16
17 1. Failures include, but are not limited to, the following:

- 18
19 a. Structural failures including, but not limited to, excessive deflection.
20 b. Noise or vibration caused by thermal movements.
21 c. Water leakage through fixed glazing and framing areas.
22 d. Failure of operating components.

23
24 2. Warranty Period: Five years from date of Substantial Completion.
25

26
27 **PART 2 - PRODUCTS**

28
29 2.1 MANUFACTURER:

- 30
31 A. Basis of Specification Manufacturer: EFCO.
32
33 B. Other Acceptable Manufacturers: Arch Amarlite, CMI Architectural Products, Inc.,
34 Kawneer Company, Vistawall, Tubelite, United States Aluminum Corporation.
35

36 2.2 MATERIALS:

- 37
38 A. Extrusions: Fabricate of 6063-T5 aluminum alloy with minimum thickness of .125 inch
39 for doors and frames and .050 inch thickness for trim and glazing stops.
40
41 B. Fasteners: Aluminum, stainless steel or plated steel.
42
43 C. Anchors: Aluminum or properly isolated steel.
44
45 D. Glazing Gaskets: Resilient Elastomeric EPDM extrusions.
46

47 2.3 GLAZED DOOR FABRICATION:

- 48
49 A. Join extrusions by mechanical fastening and welding with tight hairline joints.
50
51 B. Provide glazing gaskets and extruded aluminum snap-in glass stops of square profile.

1
2 C. Weatherstrip active leaf at center of pair of doors.

3
4 D. Fabricate doors as Medium Stile EFCO Standard Model D300.

5
6 2.4 FRAME FABRICATION:

7
8 A. Join frame members mechanically with tight hairline joints.

9
10 B. Provide glazing gaskets and extruded aluminum snap-in stops of square profile.

11
12 C. Profile and sizes to be as shown on drawings.

13
14 D. Conceal fasteners wherever possible. Exposed fasteners, where approved on shop drawings, to be phillips flat head of color to match adjacent surfaces.

15
16
17 E. Weatherstrip exterior door frames.

18
19 F. Fabricate frames at interior doors and entrances as non-thermal for single glazing as EFCO Series 402, with nominal size of 2" x 4-1/2".

20
21
22 G. Fabricate frames at exterior doors and entrances as thermally broken for insulating glass glazing as EFCO Series 960, with nominal size of 2" x 4-1/2".

23
24
25 H. Fabricate frames at exterior window units as thermally broken for insulating glass glazing as EFCO Series 960, with nominal size of 2" x 4-1/2".

26
27
28 I. At window units, provide sill flashing components and expansion head components where indicated.

29
30
31 2.5 FORMED BRAKE METAL COMPONENTS:

32
33 A. General:

34
35 1. Formed Aluminum Members, Sheet, and Plate: Aluminum conforming to ASTM B 209, and as recommended by manufacturer.

36
37 2. Sealants and gaskets within system in accordance with manufacturer's standards to meet performance requirements.

38
39 3. Fasteners: Fasteners as recommended by manufacturer. Do not expose fasteners except where unavoidable. Match finish of adjoining metal.

40
41
42 B. Brake metal fabrication:

43
44 1. Shape metal by:

45
46 a. Curving.

47 b. Extrusion bending.

48 c. Radiusing.

49 d. Stretch bending.

50
51 2. Prepare metal:

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- a. Before finish application unless acceptable results can be attained in final workpiece after finish application. Finish of final work is subject to Architect's approval.
- 3. Fabricate items as indicated on drawings and as recommended by manufacturer.
 - a. Make lines, breaks, curves and angles sharp and true.
 - b. Keep plane surfaces free from warp or buckle.
 - c. Keep surfaces free of scratches or marks caused during fabrication.
 - d. Cover exposed surfaces with pressure-sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.
- 4. Take field measurements prior to commencement of shop fabrication.
 - a. Field fabrication is allowed to ensure proper fit but keep field fabrication to minimum with majority of fabrication being done under controlled shop conditions.
 - b. Where final dimensions cannot be established by field measurement before commencement of manufacturing, make allowance for field adjustments and thermal movement as recommended by manufacturer.

2.6 FRAMING AND BRAKE METAL FINISHES:

- A. Factory finish all exposed surfaces of aluminum.
- B. Finish to be AA-M12C22A41 clear anodized, Architectural Class I, complying with AAMA 607.1.
- C. Brake metal coatings:
 - 1. Description: Provide factory-applied continuous coil anodizing system that provides surface protection against atmospheric corrosion and physical abuse.

2.7 HARDWARE:

- A. General: Refer to Section 08 70 00 Hardware for requirements for hardware items other than those indicated to be provided by the aluminum storefront supplier.
- B. The following hardware items are part of this section
 - 1. Rim Exit Device (ED1): Von Duprin #RXEL98NL-OP with Rockwood #BF157 Pull and standard strike for aluminum framing. See Section 08 70 00 for lock cylinder. Finish- US26D.
 - 2. Closer (C12): Parallel Arm Closer with stop, LCN #4110-CUSH. Finish- Silver powder coat on metal, silver plastic covers.
 - 3. Push/Pull Handles (PP5): 1 inch diameter bent bar full door width horizontal push and 1 inch diameter 3 1/2 x 10 inch long offset pull, identical to Rockwood BF15747. Finish- US26D.
 - 4. Door Weatherstripping (W2): Provide manufacturer's standard entrance door weather stripping and door bottom weather sweep.

- 1
2 C. The following hardware items are part of section 08 70 00.
3
4 1. Thresholds.
5 2. Ball bearing hinges.
6 3. Lock cylinders.
7
8 D. Locate hardware as follows unless shown otherwise on the drawings:
9
10 1. Hinges: Upper edge of top hinge 5 inches below frame head rabbet, lower edge
11 of bottom hinge 10 inches above finished floor and space center hinges equal
12 distance between top and bottom hinges.
13 2. Locksets: 40 inches above the finished floor to centerline of strike.
14 3. Exit Device Push Bar: Center line 39 inches above finished floor.
15 4. Door Pulls: Center line 42 inches above finished floor. Center between door
16 edge and glazed opening or 5 inches from door edge if no glazing.
17 5. Dead Latch: Center line 42 inches above finished floor.
18
19

20 **PART 3 - EXECUTION**

21 3.1 **INSTALLATION:**

- 22
23
24 A. Set frames in proper locations level, square, plumb and in alignment with other work in
25 accordance with manufacturer's instructions. Do not install damaged components. Fit
26 frame joints to produce hairline joints free of burrs and distortion. Rigidly secure
27 nonmovement joints. Seal joints watertight.
28
29 B. Install components to drain water passing joints and condensation and moisture occurring
30 or migrating with the system to the exterior.
31
32 C. Install doors and hardware and adjust for easy and smooth operation after glazing.
33
34 D. Machine and install electric power transfer components into frame and door stile. Install
35 electrical wiring in door and in frame to the extent that the wiring exits the frame in a
36 location suitable for external connection to be made.
37
38 E. Separate aluminum and other corrodible metal surfaces from sources of corrosion or
39 electrolytic action at points of contact with other materials
40
41 1. Zinc or cadmium plate steel anchors and other unexposed fasteners after
42 fabrication.
43 2. Paint dissimilar metals where drainage from them passes over aluminum.
44 3. Paint aluminum surfaces in contact with mortar, concrete or other masonry with
45 alkali resistant coating.
46 4. Paint wood and similar absorptive material in contact with aluminum and
47 exposed to the elements or otherwise subject to wetting with two coats of
48 aluminum paint. Seal joints between the materials with sealant.
49
50 F. Set sill members and other members in bed of sealant to provide weathertight
51 construction. Comply with requirements of Division 7 for Sealant installation.

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ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

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- G. Erect brake metal components in accordance with reviewed shop drawings; anchor supports securely in accordance with reviewed shop drawings to allow for necessary thermal movement and structural support.
- H. Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- I. Provide suitable means of anchorage acceptable to manufacturer such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- J. Exposed fastening devices to match finish and be compatible with material through which they pass.
- K. Do not install component parts that are observed to be defective, including warped, bowed, dented, abraded and broken members.
- L. Do not cut, trim or weld brake metal component parts during erection in manner that would damage finish, decrease strength, or result in visual imperfection or failure in performance. Return component parts that require alteration to shop for refabrication, if possible, or for replacement with new parts.
- M. Separate dissimilar metals and use gasketed fasteners, isolation shim, or isolation tape where needed to eliminate possibility of corrosive or electrolytic action between metals.
- N. Provide protective measures required throughout the remainder of the construction period to ensure that aluminum entrances will be without damage or deterioration, other than normal weathering, at time of acceptance.
- O. Clean exposed surfaces of aluminum.

END SECTION 08 41 13

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SECTION 08 44 13 - GLAZED CURTAIN WALL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.
- B. Related work of other Sections:
 - 1. Glazing of Curtain Wall Frames: Refer to another Division 8 section.

1.2 DESCRIPTION OF WORK:

- A. The types of windows and window walls required include the following:
 - 1. Metal stick framed systems with interior and exterior exposed metal framing.
- B. Primary components of glazed curtain wall system work (work of this section) include the following:
 - 1. Glazed aluminum curtain wall framing system.
 - 2. Glass and glazing work of curtain wall system; refer to "Glass and Glazing" section.
 - 3. Panning, sills and similar border and filler items indicated as integral components of curtain wall system.
 - 4. Joint sealer work which is associated with components of glazed curtain wall system; refer to "Joint Sealers" section.
 - 5. Anchorages, shims, fasteners, accessories and support brackets for components of glazed curtain wall system.
- C. Entrance Work: Refer to another Division 8 specification section for requirements; not work of this section.
- D. Drawings are based on Kawneer 1600 Series glazed curtain wall systems. Another standard system of a similar and equivalent nature will be acceptable when differences do not materially detract from design concept or intended performances, as judged solely by Architect.

1.3 SYSTEM PERFORMANCES:

- A. Load-Bearing Strength (Wind Resistance): Provide manufacturer's stock system, adapted to application indicated, which has been tested in accordance with ASTM E 330 to withstand at least the following loadings:
 - 1. Uniform pressure of 30 psf inward and 25 psf outward.

- B. Deflections and Thermal Movements: Obtain necessary information from Architect/Engineer on building deflections due to loadings, temperature variations, shrinkage and similar causes. Provide manufacturer's stock products and system which are capable of withstanding building movements and weather exposures including wind loading and which are capable of performing within the following limitations:
1. Normal-to-wall deflection not exceeding 1/200 of span, except 1/300 for glass supporting members.
 2. Parallel-to-wall deflections not exceeding 75 percent of glass edge clearances.
 3. Thermal movements resulting from ambient temperature range of 120 degrees F which may cause sloped glazing/window wall framing range of 180 degrees F.
- C. Leakage Resistance, Water and Air: Provide manufacturer's standard window wall system which has been tested to demonstrate permanent resistance to leakages as follows with a test pressure differential of 20 percent of design loading (excluding operable window/door edge joints, if any).
1. Air Leakage: Not more than 0.06 cfm per square foot wall area; ASTM E 283.
 2. Water Penetration: No uncontrolled leakage; ASTM E 331.
- D. Condensation Requirements: Provide manufacturer's standard or improved thermal-break construction which has been tested and certified by manufacturer, per AAMA 1502.6 with 0 degrees F outside and 25 percent relative humidity inside, to provide a condensation resistance factor (CRF) of at least 45.

1.4 SUBMITTALS:

- A. Shop Drawings: Submit drawings showing adaptation of manufacturer's standard system to project; include typical unit elevations at 1/2 inch scale and details at 3 inch scale, to show dimensioning, member profiles, anchorage system interface with building construction and glazing. Show section moduli of wind load-bearing members and calculations of stresses and deflections for performance under design loading. Show clearly on shop drawings where and how manufacturer's system deviates from contract drawings and these specifications.
- B. Samples: Submit samples of each type and color of aluminum finish, on 12 inches long sections of extrusions or formed shapes and on 6 inch squares of sheet/plate. Include 2 or more samples in each set showing near limits of variations (if any) in color and texture of finish.
1. Architect reserves right to require fabrication samples showing prime members, joinery, anchorage, expansion provisions, glazing and similar details, profiles and intersections.

1.5 WARRANTY:

- A. Provide written warranty, signed by Contractor and installer, agreeing to repair or replace defective materials and workmanship of window wall work (see primary components listing in this section) during 5 year warranty period. "Defective" is defined to include abnormal deterioration/aging/weathering, glass breakage, failure of operational parts to function normally, deterioration or discoloration of finishes, and failure of system to meet

performance requirements including structural and infiltration. Repairs or replacements required because of acts of God exceeding performance requirements, vandalism, inadequate maintenance, alterations, failure of structure supporting window wall work or other causes beyond manufacturers/fabricators/ installers/contractor's control, as judged by Architect, shall be completed by contractor/installer and paid for by Owner at reasonable prevailing rates mutually agreed upon at time of such repair/replacement work. Warranty and enforcement shall not deprive Owner of other available actions, rights or remedies.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. Manufacturer: Subject to compliance with requirements, Available manufactures having acceptable systems for installation in the project are:
 - 1. Arch Amarlite.
 - 2. Curtainwall Systems.
 - 3. EFCO, System 5600.
 - 4. Kawneer, 1600 with 2 1/2 inch wide face.
 - 5. Manko 250 Series.
 - 6. Tubelite 400 Series

2.2 MATERIALS AND COMPONENTS:

- A. Aluminum Members: Provide members (extrusions, formed members, sheet and plate) of alloy, temper and thicknesses recommended by manufacturer to comply with requirements; ASTM B 221 for extrusions, ASTM B 209 for sheet/plate.
- B. Glazing Gaskets: Manufacturer's standard sealed corner pressure glazing or wedge lock dry glazing system of resilient elastomeric glazing gaskets, setting blocks and shims or spacers as required; hardness selected by window wall manufacturer. Available gasket choices (at Contractor's Option) are:
 - 1. Gasket Material: Extruded polyvinyl chloride (PVC); ASTM D 2287.
 - 2. Gasket Material: Extruded or molded neoprene; AAMA SG-1 or ASTM D 2000, classification selected by window wall manufacturer for performance and permanence.
 - 3. Gasket Material: Extruded or molded EPDM synthetic rubber, compounded as recommended by window wall manufacturer.
 - 4. Gasket Color: Black unless otherwise indicated.
- C. Glass: Specified in "Glass and Glazing" section.
- D. Framing System Gaskets and Joint Fillers: Curtain wall manufacturer's standard permanent types, depending on joint movement and sealing requirements (sliding joints, compression, joint translation or nonmoving joints).
- E. Brackets and Reinforcements: Manufacturer's standard high strength aluminum units where feasible otherwise nonmagnetic stainless steel; except at fabricator's option,

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brackets not exposed to weather or abrasion may be hot-dip galvanized steel complying with ASTM A 386. Provide nonstaining, nonferrous shims for installation and alignment of window wall work.

- F. Concealed Flashing: Dead-soft stainless steel, 26 gage, type selected by manufacturer for compatibility.
- G. Fasteners and Accessories: Manufacturer's standard with exposed portions matching finish of curtain wall system. Provide slip-joint linings of sheets, pad, shims or washers of fluorocarbon resin or similar material recommended by manufacturer at joints where movement must be accommodated.
 - 1. Where fasteners anchor into aluminum less than 0.125 inch thick, provide noncorrosive pressed-in splined grommet nuts or other type reinforcement to receive fastener treads.

2.3 FRAMING SYSTEMS:

- A. General: Fabricate glazed curtain wall systems at manufacturers shop to greatest extent possible and prior to application to finishes. Conceal fasteners unless otherwise indicated. Make provisions to weep penetrating water and condensation to exterior.
- B. Aluminum Stick Type System: Individual member erection system with deep vertical exterior mullions glazed from outside. Fabricate with integrally concealed resilient thermal-break, so that exterior exposed aluminum does not contact interior exposed aluminum or other work and with no metal fasteners or accessories bridging break.

2.4 FINISH:

- A. Factory finish all exposed surfaces of aluminum.
- B. Finish to be AA-M12C22A41 clear anodized, Architectural Class I, complying with AAMA 607.1.

PART 3 - EXECUTION

3.1 INSPECTION, PREPARATION:

- A. Furnish inserts at proper times for setting in concrete formwork masonry and similar work indicated to support window wall work.

3.2 INSTALLATION/ERECTION:

- A. Comply with manufacturer's instructions for protection, handling and installation of fabricated window wall components, with particular attention and care in preservation of applied finishes. Discard or remove and replace damaged members.
- B. Erection Tolerances: Install glazed curtain wall components plumb, level, accurately aligned and accurately located in reference to column lines and floor levels; adjust work to conform with the following tolerances (maximum variations):

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1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40.
 2. Level: 1/8 inch x 20 feet; 1/4 inch in 40.
 3. Alignment: Limit offset of member alignment to 1/16 inch where surfaces are flush or less than 1/2 inch out of flush, and separated by less than 2 inches (by reveal or protruding work); otherwise limit offsets to 1/8 inch.
 4. Location: 3/8 inch maximum deviation from measured theoretical location (any member, any location).
- C. Anchor components securely in place in manner indicated, shimming and allowing for required movements and provide separators and isolators to prevent corrosion and electrolytic deterioration and to prevent "freeze-up" of moving joints.

3.3 CLEANING:

- A. Clean completed system, inside and out, promptly after erection and installation of glass and sealants (allow for nominal cure of liquid sealants). Curtain wall installer shall advise contractor of proper and adequate protection and cleaning procedures during remainder of construction period so that system will be without damage and deterioration at time of acceptance.
- B. At time of substantial completion, clean window wall system thoroughly and polish glass. Demonstrate proper cleaning methods and materials to owner's maintenance personnel.

END SECTION 08 44 13

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SECTION 08 70 00 - HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes the following and as indicated in the hardware schedule at the end of this section:

1. Hinges
2. Lock and Latch sets
3. Lock Cylinders and Keys
4. Exit Device
5. Closers
6. Stops
7. Bolts - Flush/Surface
8. Protection Plates
9. Door Track Systems
10. Push & Pulls
11. Weatherstripping
12. Thresholds
13. Astragals
14. Silencers
15. High Security Lock Box
16. Key Control System

- B. Related sections:

1. Division 6 Section "Architectural Woodwork" for cabinet hardware.
2. Division 8 Section "Steel Doors and Frames"
3. Division 8 Section "Wood Doors"
4. Division 8 Section "Aluminum Entrances and Storefronts" for hardware supplied by the Aluminum Entrance Supplier.
5. Division 8 Section "Coiling Counter Doors" for cylinders to be by this section.
6. Division 8 Section "Aluminum Entrances and Storefronts" for Cylinder and Keys supplied by this Section.

1.3 QUALITY ASSURANCE:

- A. Single Source Responsibility: Obtain each type of hardware from the same supplier.
- B. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only

items of door hardware that are listed and are identical to products tested by UL or other testing and inspecting organization acceptable to authorities having jurisdiction.

1.4 SUBMITTALS:

- A. Submit five copies of complete and detailed hardware schedule. Include product data on all hardware items being submitted.
- B. The submitted schedule shall use symbol/letter designations and format shown on construction documents hardware schedule. The submitted schedule shall enumerate all scheduled openings in the same order as they appear on construction documents hardware schedule.
- C. List door frames and borrowed light frames in separate schedules.
- D. Submit five copies of proposed keying schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
- E. Submit sample of each item of finish hardware that differs from that specified.
- F. Samples submitted may be used on the project and will be delivered to the building site where comparison will be made with other hardware furnished.

1.5 PRODUCT DELIVERY:

- A. Mark each item as to contents and location in the building for which it is intended.
- B. Ship prepaid the hardware templates and/or physical hardware, as required, to metal door and frame manufacturers and wood door manufacturers.
- C. Deliver drawings, templates and directions for installation of shell housing for high security lock box when unit is to be recessed mounted in poured-in-place concrete or masonry walls.

PART 2 - PRODUCTS

2.1 FINISH HARDWARE SCHEDULE:

- A. Refer to schedule bound in the drawings for hardware requirements.

2.2 ANCHORS & FASTENERS:

- A. Furnish as required and of proper size for the purpose for which it is intended.
- B. Anchors in solid material shall be with machine screws in expansion shields. Furnish toggle bolts where walls are not solid material.

2.3 HINGES:

- A. Non-removable pins on exterior doors and interior locked doors swinging out. Furnish non-rising pins on all other doors.
- B. Stainless steel hinges on exterior doors swinging out and steel hinges for all other doors.
 - 1. Exterior Hinge Finish: B.H.M.A. 629, stainless steel metal, satin (US32D).
 - 2. Interior Hinge Finish: B.H.M.A. 626, satin chromium plated (US26D).
- C. Number of Hinges:
 - 1. Three on doors less than 89 inches.
 - 2. Four on doors 89 inches and over.
- D. Hinge size: Provide hinges of the following heights and weights for door sizes as indicated below:
 - 1. 1 3/4 inches thick by 40 inches or less wide: 4 1/2 inches standard weight (0.134 inches)
 - 2. 1 3/4 inches thick by 40 inches+ to 44 inches wide: 4-1/2 inches heavy weight (0.146 inches)
 - 3. 1 3/4 inch thick by 44 inches+ to 48 inches wide: 5 inches heavy weight (0.185 inches)
- E. Acceptable Manufacturers: Stanley, McKinney, Hager.
- F. Hinge Types: Numbers are of Hager, unless otherwise specified.

TYPE	DESCRIPTION	MFR. NO.
H1	Standard weight ball bearing	BB1279 (interior); BB1191 (exterior)
H2	Heavy weight ball bearing	BB1168 (interior); BB1199 (exterior)

2.4 LOCKSETS:

- A. Design: Heavy Duty Commercial, ANSI Grade 1.
 - 1. Finish: B.H.M.A. 626, satin chromium plated (US26D).
- B. Backset: 2-3/4 inches.
- C. Furnish 2-3/4 inches high box type strikes with lip to project 1/8 inch beyond trim, frame or inactive leaf.
- D. Furnish for backup stock a minimum of 3 complete units of each function.
- E. Acceptable Manufacturers: Sargent Manufacturing Co.; Schlage Lock Division, IR Security Technologies; Yale Security Inc., Architect pre-approved equal.
- F. Lock types/functions: Numbers are ANSI, unless noted otherwise.

TYPE	FUNCTION	A.N.S.I. No.
L1	Passage Latch	F75
L2	Bath/Bedroom Privacy Lock	F76
L3	Entrance/Office Lock	F82
L4	Not Used.	
L5	Storeroom Lock	F86

2.5 LOCK CYLINDERS AND KEYING:

- A. Hardware supplier shall make arrangements to meet with Owner for the purpose of determining the various keying requirements.
- B. Lock cylinders and keying shall be compatible with "Best ISC" core system, having a type "L" keyway.
- C. Cylinder supplier shall provide "Pinning Sequence" information to Owner.
- D. Keying shall be a continuation of the existing campus system.
- E. Provide new masterkey system for Project.
- F. Master key and Grand-Master key all locks and cylinders.
- G. Furnish five master keys for each master keyed set and three nickel silver change keys for each lock.
- H. Furnish five grand-master keys, five master keys for each master keyed set and three nickel silver change keys for each lock.
- I. Stamp "DO NOT DUPLICATE" on all keys.
- J. Furnish visual key control for all cylinders. Stamp proper key symbol on the bow of each key and on the face of the cylinder plug of each cylinder.
- K. Cylinders shall be supplied by manufacturer of locksets.
- L. Furnish manufacturer's standard 6-pin tumbler cylinders.
- M. Furnish removable core cylinders for all locks. Send control key where directed. Provide six extra cores with keys. Master key extra cores.
- N. Provide cylinders for Aluminum Entrance systems where scheduled, deadbolts, exit devices.
- O. Metals: Construct lock cylinder parts from brass or bronze, stainless steel, or nickel-silver. Aluminum, zinc, or plastic parts are not acceptable. Exposed finish shall match lockset, deadbolt, or exit device.
- P. Deliver keys to the Owner via registered mail.

2.6 SECURITY DEAD BOLTS:

- A. General: For use at exterior and interior doors where scheduled.
- B. ANSI Grade 1.
- C. Bolt: 1 inch throw stainless steel dead bolt, with square corners.
- D. Strike: Provide 1 1/8 inchx2 3/4 inch x3/32 inch box type strike.
- E. Cylinder: As indicated under "Lock Cylinders and Keying."
- F. Backset: 2 3/4 inches.
- G. Deadbolt Finish:
 - 1. B.H.M.A. 626, satin chromium plated (US26D).
- H. Security Deadbolt types: Numbers are ANSI, unless otherwise noted.

TYPE	DESCRIPTION	ANSI NO.
SD1	Double Cylinder Deadbolt	E2141
SD2	Cylinder Only Deadbolt	E2101
SD3	Indicator Deadbolt with Thumbturn	Schlage B571

2.7 EXIT DEVICES:

- A. Exit Device Finish:
 - 1. B.H.M.A. 626, satin chromium plated (US26D).
- B. Acceptable Manufacturers: Von Duprin, Sargent.
- C. Exit Device Types: Numbers are of Von Duprin

TYPE	DESCRIPTION	MFR. NO.
ED1	Rim Exit Device w/10" Optional offset bar pull, Rockwood BF 157	98NL-OP
ED2	Rim Exit Device w/Blank Escutcheon	98L-BE
ED3	Rim Exit Device w/Flat Pull and Night Latch function	98 series, 696NL Trim
ED4	Rim Exit Device w/Flat Pull	22 series, 230DT Trim
ED5	Rim Exit Device w/Flat Pull and Night Latch function	22 series, 230 NL Trim

2.8 DOOR CLOSERS:

- A. Size according to manufacturer's printed recommendation.

- B. Provide arms, accessories, and non-metallic closer covers with the following finish:
- C. Provide arms, accessories, and metallic closer covers with the following finish:
 - 1. B.H.M.A. 652, satin chromium plated (US26D).
- E. Acceptable Manufacturers: LCN.
- F. Closer types: Numbers are of LCN.

TYPE	DESCRIPTION	MFR. NO.
C1	Regular Arm Closer	4010
C2	Parallel Arm Closer	4110
C3-C5 Not Used.		
C6	Parallel Arm Closer with stop	4110-CUSH
C7-C10 Not Used.		
C11	Parallel Arm Closer with hold open CUSH, delayed action and 5 lb. opening force	4110H-DA-CUSH
C12 Not used.		
C13	Parallel Arm Closer with manual hold open handle	4110-3049CNS

2.9 STOPS:

- A. Wall Mounted Stop
 - 1. Stops and Bumpers: Cast brass or bronze with convex/concave rubber bumper.
 - 2. Acceptable Manufacturer: Hager, NT Quality, Ives.
- B. Overhead Stops
 - 1. Size according to manufactures recommendations.
 - 2. Acceptable manufacturers: Glynn-Johnson, Rixson.
- C. Stop Finishes:
 - 1. B.H.M.A. 626, satin chromium plated (US26D).
- D. Stop types: Wall stop numbers are Ives: Overhead stop numbers are Glynn Johnson.

TYPE	DESCRIPTION	MFR. NO
S1	Not used	
S2	Wall Mounted (concave)	WS402CCV
S3	Overhead (concealed)	100S
S4	Overhead (concealed) with holder	100H

2.10 BOLTS:

- A. Manual

1. Furnish on top and bottom of inactive leaf with downset of top bolt approximately 72 inches above finished floor. Bottom bolt to be 12 inches above floor.
2. Furnish dustproof strike for all bottom bolts.
3. Acceptable Manufacturers: Ives, Sargent, Russwin, Corbin, Glynn-Johnson, NT Quality.

B. Flush Bolt Finishes:

1. B.H.M.A. 626, satin chromium plated (US26D).

C. Flush Bolt (and strikes) Types: Numbers are of Ives.

TYPE	DESCRIPTION	MFR. NO.
F1	Manual, metal doors	FB458 & DP2

2.11 PROTECTION PLATES:

- A. Size 1-1/2 inches less than door width. Furnish for stop side of door only. Drill holes and furnish oval head sheet metal screws 1/2 inch in from edge and not over 8 inches on center. Kickplates shall be beveled three edges.
- B. Kickplates: 16 gauge stainless steel, satin finish.
- C. Armor Plates: Same material as kickplates.
- D. Coordinate cutouts in armor plates for locksets and hinges
- E. Acceptable Manufacturers: Hiawatha, Cipco, NT Quality, Rockwood.
- F. Kickplate Types: Numbers are of Rockwood Manufacturing Company.

TYPE	DESCRIPTION	MFR. NO.
K1	Not Used	
K2	Armor Plate, 36 inch height & Mortise type Door EdgeGuards- both edges	K1062 & 302

2.12 DOOR TRACK SYSTEMS:

- A. Sliding Door Hardware : Provide a complete set of operating hardware for interior sliding doors as shown on the drawings.
- B. Basis-Of-Specification Manufacturer is Henderson/Pemko, 5535 Distribution Drive, Memphis, TN, 38141; 800-824-3018. Subject to compliance with requirements provide specified products or Architect pre-approved equal.

- C. Barn Sliding Door Track and Hanger Set: Numbers are of Henderson Pemko and are based on the "280-307" track system:

TYPE	DESCRIPTION	MFR. NO.
DT1	Track	280
	Brackets	1A
	Hangers/Trolleys	53
	Floor guides	31S
	Accessories	
	Stops	107
	Bow handle	863
	Cane Bolt	994

- D. Refer to drawings for required lengths.

2.13 PUSH & PULLS:

- A. Furnish thru bolts and countersunk washer if mounting screw is exposed on opposite side of door.
- B. Provide plates with four beveled edges.
- C. Plates shall be made of 16 gauge stainless steel.
- D. Push plates and pull finish:
1. Stainless steel, satin finish.
- E. Acceptable Manufacturers: Cipco, Hager Hinge Co., Hiawatha, NT Quality, Rockwood.
- F. Push & Pull Set: Numbers are of Rockwood

TYPE	DESCRIPTION	MFR. NO.
	PP1 & PP2 Not Used.	
PP3	Push Plate 3-1/2"x15", Push Plate and Pull Handle 1 inch diameter by 10 inches center length, Type 9 fastening	70B 111x70B
PP4	Not Used.	
PP5	Pull Handle Bar- 1" diameter x 10" c. to c. with 3 1/2" offset. Push Bar 1" diameter x c. to c. to suit door.	BF15747

2.14 WEATHERSTRIPPING:

- A. Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.

- B. Acceptable Manufacturers: Reese Enterprises, Inc; Zero International; Pemko Manufacturing Co., Inc.; National Guard Products, Inc.
- C. Weatherstrip sets: Numbers are of Reese Enterprises, Inc.

TYPE	DESCRIPTION	MFR. NO.
W1	Jamb and head weatherstrip Door bottom/shoe	775A DB595AU
W2	Sliding door weatherstrip	965C

2.15 THRESHOLDS:

- A. Extruded aluminum extending to outside edge of door frames.
- B. Acceptable Manufacturers: Reese Enterprises, Inc; Zero International; Pemko Manufacturing Co.,Inc.; National Guard Products, Inc.
- C. Threshold types: Numbers are of Reese Enterprises, Inc.

TYPE	DESCRIPTION	MFR. NO.
T1	Extruded aluminum, thermal break, 5 inches wide	S282A

2.16 SILENCERS:

- A. Numbers are Ives.
- B. Furnish three SR64 (metal frames) rubber silencers at strike jamb of each single door.
- C. Furnish two SR64 (metal frames) rubber silencers at head jamb of double doors.
- D. Omit silencers at exterior doors and sound or light sealed doors.

2.17 HIGH SECURITY LOCK BOX:

- A. Provide (surface) (recessed) mounted high security lock box with the following properties:
 1. Constructed of 1/4 inch plate steel housing with all joints welded, 1/2 inch thick solid steel plate door, 1/8 inch stainless steel lock cover and weatherproof interior door gasket.
 2. Size shall be approximately 5 inches high x 4 inches wide x 3-1/4 inches deep with an interior capacity of 30 cubic inches. Recessed mount unit shall have an integral flange creating an overall face dimension of 7 inches x 7 inches square.
 3. Provide recessed mounting kit for units to be mounted in poured-in-place concrete or masonry walls.
 4. Steel shall have zinc-phosphate pre-treatment with polyester powder coat finish inside and out. Finish color shall be aluminum.

5. Box and lock shall be U.L. listed.
6. Lock shall be high security Medeco lock with double action rotating tumblers and hardened steel pins. Key shall be bias cut. Lock shall have a 1/8 inch stainless steel dust cover with tamper seal mounting capability.
7. Units shall be Model 3200 series as manufactured by Knox Company, (800) 552-5669 or equal.

2.18 KEY CONTROL SYSTEM:

- A. Furnish one key cabinet Key Control Systems or Architect approved equal, complete system with capacity for 150 percent of the number of locks required for the project.
- B. Hardware supplier shall properly mark and place keys in Lund 10" x 12" locking key cabinet and completely fill in all information on alphabetical, hook and key numerical index cards and instruct Owner's representative in the proper use of key control system.
- C. Hardware supplier shall properly mark and tag all keys with a Lund Equipment Company C-1507 tag for each lock and list on No. 511-1 index card.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install all hardware in accordance with the manufacturer's recommendations.
- B. Drill and tap hollow metal doors and frames for surface applied hardware.
- C. Remove all applied hardware until painting is completed, then reinstall.
- D. Locate hardware as follows unless shown otherwise on the drawings:
 1. Hinges: Upper edge of top hinge 5 inches below frame head rabbet, lower edge of bottom hinge 10 inches above finished floor and space center hinges equal distance between top and bottom hinges.
 2. Locksets: 40 inches above the finished floor to centerline of strike.
 3. Stops: Install on door if wall condition is not applicable.
 4. Flush Bolts: Edge mount.
 5. Exit Device Push Bar: Center line 39 inches above finished floor.
 6. Door Pulls: Center line 42 inches above finished floor. Center between door edge and glazed opening or 5 inches from door edge if no glazing.
 7. Push Plates: Center line 44 inches above finished floor. Center plate between door edge and glazed opening or 1 inch from edge of plate to edge of door if no glazed opening.
- E. Install door weatherstripping continuous without coping at hardware. Mount hardware to be located in the same location over the weatherstripping.
- F. Deliver recessed mounting kit for high security lock box to contractor for installation into wall construction so construction of wall will not be delayed.

3.2 ADJUSTMENT:

- A. Adjust all operating hardware in accordance with manufacturer's recommendations.
- B. Deliver to Owner all installation and adjustment tools and two copies of each installation sheet furnished with hardware items.

END SECTION 08 70 00

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SECTION 08 71 13 - AUTOMATIC DOOR OPERATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. Types of work includes:

- 1. Electro-mechanical swinging door operator and electric control.
- 2. Hard-wired push-plate system.

- B. Related sections:

- 1. Another Division 08 Section, "Aluminum Framed Storefront Systems" for finish requirements.
- 2. Electrical conduit and wiring to header by Electrical Contractor.

1.3 STANDARDS:

- A. Comply with BHMA A156.10, "Power Operated Pedestrian Door Standard."

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for door operators. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

- B. Shop Drawings: For door operators, include plans, elevations, sections, details, hardware mounting heights, and attachments to other work.

- 1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- 2. Wiring Diagrams: For power, signal, and control wiring.
- 3. Activation and safety devices.
- 4. Include hardware schedule and indicate hardware types, functions, quantities, and locations.

- C. Samples for Initial Selection: For units with factory-applied color finishes.

- D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

- E. Product Certificates: For each type of door operator, from manufacturer.
- F. Maintenance Data: For door operators, safety devices, and control systems to include in maintenance manuals.
- G. Warranties: Sample of special warranties.

1.5 PRODUCT HANDLING:

- A. Deliver, store and protect manufactured materials to comply with referenced standards.

1.6 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door operators that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including, but not limited to, excessive deflection.
 - b. Faulty operation of operators, controls, and hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - 2. Warranty Period: Two years from date of Substantial Completion.
 - 3. Provide Warranty forms with product submittals for subsequent review by Architect and for final inclusion in O&M Manuals.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Acceptable manufacturers:
 - 1. Besam Automated Entrance Systems: "PowerSwing".
 - 2. Dor-O-Matic: "Astro-Swing."
 - 3. Horton Automatics: "Series 4000LE".
 - 4. Stanley: "Magic-Force."
 - 5. Tormax Technologies, Inc.: "iMotion 1301."

2.2 EQUIPMENT:

- A. The operator shall be an electro-mechanical system enclosed in a sealed cast aluminum case. The system shall be fully lubricated to minimize wear and friction of movable parts.
- B. The operator shall open the door with a DC motor through reduction gears, ball screw actuator, forged steel rack and pinion, and linkage assembly. The operator shall stop the door in the open position at a 90 degree stop. All bearings shall be ball or roller type.

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- C. The operator shall close the door by spring energy. Closing speed shall be adjusted to meet ADA requirements, minimum. The operator shall function as a manual closer in the event of power failure.
- D. The operator shall meet the requirements of ANSI A 156.19 for "Power Operated Pedestrian Doors.
- E. The electrical controls shall be a solid state, microprocessor based controller. The unit shall have a reverse on obstruction feature.

2.3 CONTROLS:

- A. Provide push plate switch type controls. Controls shall provide hardwired control operation.
- B. Interior controls, Door jamb mounted, single gang narrow push plate and pedestal with 2-gang box size. See drawings for location.
- C. Exterior controls: Manufacturer's standard 2-gang box size. See drawings for location.
- D. Provide junction boxes, fasteners and satin stainless steel push plates.
- E. Push plate shall have handicapped accessible pictorial and the words "PUSH TO OPEN."

2.4 FINISHES:

- A. Provide all exposed finishes to match adjacent aluminum storefront framing system door frame.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Inspect existing conditions prior to installation of unit.
- B. Coordinate installation with Electrical Contractor.

3.2 INSTALLATION:

- A. Install automatic door operator and accessories per manufacturer written instructions.
- B. The installation of the equipment shall be done by a factory trained contractor.
- C. Test the equipment for smooth operation.

END SECTION 08 71 13

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SECTION 08 80 00 - GLASS AND GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes glazing for the following products, including those specified in other sections where glazing requirements are specified to this section:

1. Glazed curtain walls
2. Glazed entrances
3. Doors
4. Storefront construction
5. Service window assembly

- B. See glass schedule at the end of this section.

1.3 QUALITY ASSURANCE:

- A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to the indicated for Project and whose work has resulted in construction with a record of successful in-service performance.

- B. Applicable Standards:

1. Primary Glass Standard: ASTM C 1036.
2. Heat-Treated Glass Standard: ASTM C 1048.
3. Safety Glass Standard: Category II materials complying with testing requirements in 16 CFR Part 1201 and ANSI Z97.1.
4. Insulating Glass Standard: ASTM E 774 and SIGMA TM-3000 "Vertical Glazing Guidelines."

- C. Single Source Responsibility for Glazing Accessories: Obtain glazing accessories from one source for each product and installation method indicated.

1.4 PERFORMANCE REQUIREMENTS:

- A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

- B. Glass Design: Confirm glass thickness by analyzing Project loads and in-service conditions. Provide glass lites for various size openings in nominal thicknesses indicated, but not less than thickness and in strengths required to meet or exceed design wind loads and lateral deflection standards.
- C. Thermal Movements: Provide glazing that allows for thermal movements resulting from change in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1.5 SUBMITTALS:

- A. Submit product data for each glass product and glazing material indicated.
- B. Samples: Submit 1 sample, 12 inches square, of each tinted glass product.

1.6 JOB CONDITIONS:

- A. Preinstallation: Meet with Glazier and other trades affected by glass installation, prior to beginning of installation. Do not perform work under adverse weather or job conditions. Install liquid sealants when temperatures are within lower or middle third of temperature range recommended by manufacturer.

1.7 SPECIFIED PRODUCT WARRANTY:

- A. Warranty on Hermetic Seals: Provide insulating glass manufacturer's written warranty, agreeing to, within specified warranty period, furnish FOB project site, replacement units for insulating glass units which have defective hermetic seals.
- B. Warranty period is ten (10) years after seal date permanently imprinted on unit, but not less than nine (9) years after date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Products: Subject to compliance with requirements, provide products specified from the following approved Manufacturers:
 - 1. AFG Industries, Inc.
 - 2. Guardian Industries
 - 3. OldCastle Glass, Inc.
 - 4. Pilkington Glass, Ltd.
 - 5. PPG Industries, Inc.

2.2 PRIMARY FLOAT GLASS:

- A. Float Glass: ASTM C 1036, Type I (transparent glass, flat), Class 1, Quality q3 (glazing select), clear unless otherwise indicated.

2.3 HEAT-TREATED FLOAT GLASS:

- A. Heat Strengthened Glass: Provide prime glass of color and type indicated, which has been heat treated (Kind HS) to strengthen glass in bending to not less than 2.0 times annealed strength.
- B. Tempered Glass: Provide prime glass of color and type indicated, which has been heat treated (Kind FT) to strengthen glass in bending to not less than 4 to 5 times annealed strength, free of tong marks.

2.4 INSULATING GLASS:

- A. Preassembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774.
- B. Heat strengthen or temper glass lites as indicated in glazing schedule at the end of this Section.
- C. Low-Emissivity Coated Heat Treated Insulating Glass: Provide 2 sheets of glass as follows:
 - 1. Outboard Lite: Clear float glass, Quality q3, 1/4 inch thick, Kind HT.
 - 2. Air Space: 1/2 inch air space, with -20 degrees F (-29 degrees C) dew point, with manufacturers standard edge construction to maintain a hermetic seal.
 - 3. Inboard Lite: Clear float glass, Quality q3, 1/4 inch thick, Kind HT with low-emissivity coating sputter coated to the No. 3 surface.
 - 4. Nominal Performance:

Visible light transmittance:	70
Winter nighttime U-Value:	.29
Solar Heat Gain Coefficient:	.38
Outdoor visible reflectance:	11%
- D. Low-Emissivity Coated Tempered Insulating Glass: Provide 2 sheets of glass as follows:
 - 1. Outboard Lite: Clear float glass, Quality q3, 1/4 inch thick, Kind FT.
 - 2. Air Space: 1/2 inch air space, with -20 degrees F (-29 degrees C) dew point, with manufacturers standard edge construction to maintain a hermetic seal.
 - 3. Inboard Lite: Clear float glass, Quality q3, 1/4 inch thick, Kind FT with low-emissivity coating sputter coated to the No. 3 surface.
 - 4. Nominal Performance:

Visible light transmittance:	70
Winter nighttime U-Value:	.29
Solar Heat Gain Coefficient:	.38
Outdoor visible reflectance:	11%
- E. Low-Emissivity Coated Heat Treated Insulating Spandrel Glass: Provide 2 sheets of glass as follows:
 - 1. Outboard Lite: Clear float glass, Quality q3, 1/4 inch thick, Kind HT.

2. Air Space: 1/2 inch air space, with -20 degrees F (-29 degrees C) dew point, with manufacturers standard edge construction to maintain a hermetic seal.
3. Inboard Lite: Clear float glass, Quality q3, 1/4 inch thick, Kind HT with low-emissivity coating sputter coated to the No. 3 surface and black 50% frit on the No. 4 surface.
4. Nominal Performance:

Visible light transmittance:	37
Winter nighttime U-Value:	0.29
Solar Heat Gain Coefficient:	0.35
Outdoor visible reflectance:	11%

2.5 GLAZING SEALANTS AND COMPONENTS:

- A. General: Provide color of exposed sealant/compound indicated or if not otherwise indicated, as selected by Architect from manufacturer's standard colors or black if no color is so selected. Comply with manufacturer's recommendations for selection of hardness, depending upon the location of each application, conditions at time of installation and performance requirements as indicated. Select materials and variations or modifications carefully for compatibility with surfaces contacted in the installation. Coordinate with other sections in Division 8 for glazing components that are supplied in those sections and supplement as required.
- B. 1-Part Silicone Rubber Glazing Sealant: Elastomeric silicone sealant complying with FS TT-S-001543, Class A, nonsag. Provide acid type recommended by manufacturer where only nonporous bond surfaces are contacted; provide nonacid type recommended by manufacturer where one or more porous bond surfaces are contacted.
- C. Acrylic Emulsion Glazing Sealant: Emulsion of acrylic, with or without latex rubber modification; compounded specifically for glazing; nonhardening, nonstaining and nonbleeding.
- D. Butyl Rubber Glazing Sealant: Compound of polymerized butyl rubber and inert fillers, solvent based, 75 percent solids, complying with FS TT-S-001657; tack free in 24 hours., paintable, nonstaining.
- E. Preformed Butyl Rubber Glazing Sealant: Compound of polymerized butyl rubber and inert fillers, with or without polyisobutylene modification, solvent based, 95 percent solids, formed and coiled on release paper; tack free in 24 hours., paintable, nonstaining; plain, preshimmed or reinforced as required for proper installation and setting of glass.

2.6 GLAZING GASKETS:

- A. Structural Rubber Glazing Gaskets: Neoprene extrusions fabricated into frames with molded corner units and zipper lock strips; comply with ASTM C 542. Coordinate with other sections in Division 8 for glazing components that are supplied in those sections and supplement as required.
- B. Molded Neoprene Glazing Gaskets: Molded or extruded neoprene gaskets of the profile and hardness required for watertight construction; comply with ASTM D 2000 designation 2BC 415 to 3BC 620, black.

- C. Cellular Neoprene Glazing Gaskets: Extruded/molded, closed cell, integral skinned neoprene of profile required to maintain watertight seal; comply with ASTM C 509, Type II, black.
- D. Vinyl Foam Glazing Tape: Closed cell, flexible, self-adhesive, nonextruding, polyvinyl chloride foam tape; recommended by manufacturer for exterior, exposed, watertight installation of glass, with only nominal pressure in the glazing channel; comply with ASTM D 1667.

2.7 MISCELLANEOUS GLAZING MATERIALS AND SYSTEMS:

- A. Cleaners, Primers and Sealers: Type recommended by sealant or gasket manufacturer.
- B. Setting Blocks: Neoprene or EPDM, 80-90 durometer hardness, with proven compatibility with sealants used.
- C. Spacers: Neoprene or EPDM, 40-50 durometer hardness with proven compatibility with sealants used.
- D. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement.
- E. Compressible Filler (Rod): Closed cell or waterproof jacketed rod stock of synthetic rubber or plastic foam, proven to be compatible with sealants used, flexible and resilient, with 5-10 psi compression strength for 25 percent deflection.
- F. Service Window Component System:
 - 1. Basis-Of-Design manufacturer and product: C.R. Lawrence, provide service windows based on stock components of the "DW" Series, DW2000A, satin anodized, with screen.
 - 2. Provide with laminated insulating glass.
 - 3. Provide keyed lock.
 - 4. Provide burglar bar.
 - 5. Provide complete glazed assemblies in sizes and configurations as indicated on the drawings.

PART 3 - EXECUTION

3.1 STANDARDS AND PERFORMANCE:

- A. Watertight and airtight installation of each glass product is required, except as otherwise shown. Each installation must withstand normal temperature changes, wind loading, impact loading (for operating sash and doors), without failure including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials and other defects in the work.
- B. Protect glass from edge damage during handling and installation and subsequent operation of glazed components of the work. During installation, discard units with significant edge damage or other imperfections.

- C. Glazing channel dimensions as shown are intended to provide for necessary bite on glass, minimum edge clearance and adequate sealant thicknesses, with reasonable tolerances. Adjust as required by job conditions at time of installation.
- D. Comply with combined recommendations and technical reports by manufacturers of glass and glazing products as used in each glazing channel and with recommendations of Glass Association of North America (GANA) "Glazing Manual," except where more stringent requirements are indicated.
- E. Install insulating glass units to comply with recommendations by Sealed Insulating Glass Manufacturers Association, except as otherwise specifically indicated or recommended by glass and sealant manufacturers.

3.2 PREPARATION FOR GLAZING:

- A. Clean glazing channel and other framing members to receive glass immediately before glazing. Remove coatings which are not firmly bonded to substrate. Remove lacquer from metal surfaces where elastomeric sealants are used.
- B. Apply primer or sealant to joint surfaces where recommended by sealant manufacturer.

3.3 GLAZING:

- A. Install setting blocks of proper size in sill rabbet, located 1/4th of glass width from each corner. Set blocks in thin course of heel-bead compound, if any.
- B. Provide spacers inside and out, of proper size and spacing, for glass sizes larger than 50 united inches, except where gaskets or preshimmed tapes are used for glazing. Provide 1/8 inch minimum bite of spacers on glass and use thickness equal to sealant width, except with sealant tape use thickness slightly less than final compressed thickness of tape.
- C. Set units of glass in each series with uniformity of pattern, draw, bow and similar characteristics.
- D. Voids and Filler Rods: Prevent exudation of sealant or compound by forming voids or installing filler rods in channel at heel of jambs and head (do not leave voids in sill channels), except as otherwise indicated and depending on light size, thickness and type of glass and complying with manufacturer's recommendations.
- E. Force sealants into channel to eliminate voids and to ensure complete "wetting" or bond of sealant to glass and channel surfaces.
- F. Tool exposed surfaces of glazing liquids and compounds to provide a substantial "wash" away from glass. Install pressurized tapes and gaskets to protrude slightly out of channel, so as to eliminate dirt and moisture pockets.
- G. Clean and trim excess glazing materials from glass and stops or frames promptly after installation and eliminate stains and discolorations.

- H. Where wedge shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage to ensure that gasket will not "walk" out when installation is subjected to movement. Anchor gasket to stop with matching ribs or by proven adhesives, including embedment of gasket tail in cured heel bead.
- I. Gasket Glazing: Miter cut and bond ends together at corners where gaskets are used for channel glazing, so that gaskets will not pull away from corners and result in voids or leaks in glazing system.
- J. Structural Gasket Glazing: Cut zipper strips slightly long, to ensure tight closure. Lubricate zipper strip and use special tool to install zipper. Do not lubricate glazing channel or anchorage rabbet. Comply with details as shown and manufacturer's instructions, including the possible use of liquid sealants and weep holes.

3.4 CURE, PROTECTION AND CLEANING:

- A. Protect exterior glass from breakage immediately upon installation, by use of crossed streamers attached to framing and held away from glass. Do not apply markers to surfaces of glass. Remove nonpermanent labels and clean surfaces. Cure sealants for high early strength and durability.
- B. Remove and replace glass which is broken, chipped, cracked, abraded or damaged in other ways during construction period, including natural causes, accidents and vandalism.
- C. Wash and polish glass on both faces not more than 4 days prior to date scheduled for inspections intended to establish date of substantial completion in each area of project. Comply with glass product manufacturer's recommendations for final cleaning.

3.5 GLASS SCHEDULE:

- A. See drawings for location of the following glass number designations.
 - G1 1/4 inch Clear float glass
 - G2 1/4 inch Tempered clear
 - G3 1 inch Insulated low emissivity coated, heat strengthened, clear
 - G4 1 inch Insulated low emissivity coated, tempered, clear
 - G5 1 inch Insulated low emissivity coated, heat strengthened, spandrel

END SECTION 08 80 00

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SECTION 08 90 00 - LOUVERS AND VENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. The extent of louvers and vents is shown on the drawing, including indications of sizes and locations.
- B. Types of louvers and vents include the following:
 - 1. Formed sheet metal louvers
- C. Related sections:
 - 1. Sealants including installation are specified in a Division 7 section.
 - 2. Field-applied paint is specified in a Division 9 section.
 - 3. Blank-off plates for air-handling louvers are specified in a Division 23 Section.
 - 4. Performance criteria are defined on the drawings.

1.3 QUALITY ASSURANCE:

- A. Performance Requirements:
 - 1. Where louvers are indicated to comply with specific performance requirements, provide units whose performance ratings have been determined in compliance with AMCA Standard 500.
 - 2. AMCA Certification: Where indicated, provide louvers with AMCA Certified Ratings Seal evidencing that product complies with above requirement.
- B. Comply with SMACNA "Architectural Sheet Metal Manual" recommendations for fabrication, construction details and installation procedures, except as otherwise indicated.
- C. Field Measurements: Verify size, location and placement of louver units prior to fabrication, wherever possible.
- D. Shop Assembly: Coordinate field measurements and shop drawings with fabrication and shop assembly to minimize field adjustments, splicing, mechanical joints and field assembly of units. Preassemble units in shop to greatest extent possible and disassembly only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.4 SUBMITTALS:

- A. Product Data: Submit manufacturer's specifications; certified test data, where applicable; and installation instructions for required products, including finishes.
- B. Shop Drawings: Submit shop drawings for fabrication and erection of louver units and accessories. Include plans, elevations and details of sections and connections to adjoining work. Indicate materials, finishes, fasteners, joinery and other information to determine compliance with specified requirements.
- C. Samples: Submit 3 samples, 6 inches square, of each required aluminum finish. Prepare samples on metal of the same gage and alloy to be used in work. Where normal color and texture variations are to be expected, include 2 or more units in each sample showing the limits of such variations.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Galvanized Sheet Steel: ASTM A 526 and A 527, with ASTM A 525, G90 zinc, coating, mill phosphatized.
- B. Cold-rolled Sheet Steel: ASTM A 366, Class I, matte finish.
- C. Fastenings: Use same material as items fastened, unless otherwise indicated. Fasteners for exterior applications may be hot-dip galvanized, stainless steel or aluminum. Provide types, gages and lengths to suit unit installation conditions. Use Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.
- D. Anchors and Inserts: Use non-ferrous metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use steel or lead expansion bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.
- E. Bituminous Paint: SSPC-Paint 12 (cold-applied asphalt mastic).

2.2 FABRICATION, GENERAL:

- A. Provide louvers and accessories of design, materials, sizes, depth, arrangement, and metal thicknesses indicated, or if not indicated, as required for optimum performance with respect to airflow; water penetration; air leakage, where applicable (for adjustable units, if any); strength; durability; and uniform appearance, as suited to applications shown and intended use.
- B. Fabricate frames including integral sills to suit adjacent construction with adequate tolerances for installation including application of sealants in joints between louvers and adjoining work, where applicable.
- C. Include supports, anchorages, and accessories required to achieve a complete assembly, properly installed.

- D. Provide vertical mullions of type and at spacings indicated but not further apart than recommended by manufacturer or 72 inches whichever is less. At horizontal joints between louver units provide horizontal mullions except where continuous vertical assemblies are indicated.
- E. Provide sill extensions and loose sills made of same material as louvers, where indicated, or required for drainage to exterior and to prevent water penetrating to interior.
- F. Join frame members to one another and to stationary louver blades by welding, except where indicated otherwise or where field bolted connections between frame members are made necessary by size of louvers. Maintain equal blade spacing including separation between blades and frames at head and sill to produce a uniform appearance.

2.3 STATIONARY FORMED SHEET METAL LOUVERS:

- A. Horizontal Drainage Blade Louvers: Units designed to collect and drain water to exterior at sill by means of gutters on front edges of louver blades and channels in jambs and mullions; of depth and sizes indicated, fabricated from the following metal:
 - 1. Galvanized steel: Not less than 16 gage.

2.4 LOUVER SCREENS:

- A. Provide removable screens for exterior louvers.
- B. Fabricate screen frames of the same metal and finish as the louver units to which secured, unless otherwise indicated.
 - 1. Provide frames consisting of U-shaped metal for permanently securing screen mesh.
- C. Use insect screens where indicated, of the following:
 - 1. Mesh, 0.011" anodized aluminum wire.
- D. Use bird screens where indicated, of the following:
 - 1. 1/2" sq. mesh. 0.0625" galvanized steel wire.
- E. Locate screens on inside face of louvers, unless otherwise indicated. Secure screens to louver frames with machine screws, spaced at each corner and at 12 inches on center between.

2.5 METAL FINISHES:

- A. General:
 - 1. Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations, except as otherwise indicated. Apply finishes in factory after products are assembled. Protect finishes on exposed surfaces with

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protective covering, prior to shipment. Remove all scratches and blemishes from exposed surfaces which will be visible after completing finishing process.

2. Provide colors or color matches as indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors.

B. Ferrous Metal Finishes:

1. Preparation: Clean surfaces of dirt, grease and loose rust or mill scale, including items fabricated from galvanized steel, if any. Apply finish to all surfaces of fabricated and assembled units, whether exposed or concealed when installed, after pretreating with a conversion coating suited to organic coating applied over it.
2. Baked Enamel Finish: Immediately after cleaning and pretreatment, apply manufacturer's standard 2-coat baked-enamel finish consisting of epoxy resin and thermosetting topcoat, with overall dry film thickness, not less than 3.0 mils.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Coordinate setting drawings, diagrams, templates, instructions and directions for the installation of anchorages which are to be embedded in concrete or masonry construction. Coordinate the delivery of such items to the project site.

3.2 INSTALLATION:

- A. Locate and place louver units plumb, level and in proper alignment with adjacent work.
- B. Use concealed anchorages wherever possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form tight joints with exposed connections accurately fitted together. Provide reveals and openings for sealants and joint fillers, as indicated.
- D. Repair finishes damaged by cutting, welding, soldering and grinding operations required for fitting and jointing. Restore finishes and prime coats of paint so that there is no evidence of corrective work. Return items which cannot be refinished in the field to the shop, make the required alterations, and refinish the entire unit, or provide new units, at Contractor's option.
- E. Protect galvanized and non-ferrous metal surfaces from corrosion or galvanic action by application of a heavy coating of bituminous paint on surfaces which will be in contact with concrete, masonry or dissimilar metals.
- F. Provide concealed gaskets, flashings, joint fillers, and insulations, and install as the work progresses to make the installations weathertight.
- G. Refer to Division 7 sections for sealants in connection with installations of louvers.

END SECTION 08 90 00

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes the following:

1. Non-load bearing steel stud framing
2. Gypsum wallboard attached to steel framing
3. Gypsum wallboard attached to wood trusses
4. Ceiling Suspension Systems.
5. Adhesively bonded gypsum wallboard

- B. Related sections:

1. Load Bearing Steel Framing: Refer to Division 5 Section- "Light Gage Metal Framing."
2. Gypsum Sheathing: Refer to Division 6 Section- "Rough Carpentry."
3. Thermal insulation is specified in a Division 7 Section.

1.3 QUALITY ASSURANCE:

- A. Fire Resistance Ratings: Where fire resistance rated gypsum board assemblies are indicated, assemblies shall comply with design designations as indicated in GA-600 "Fire Resistance Design Manual" or UL "Fire Resistance Directory" or in the listing of another testing and inspecting agency acceptable to authorities having jurisdiction.

1.4 JOB CONDITIONS:

- A. Maintain temperature at 50 degrees F or more for at least 48 hours prior to installation, during installation and until heating system is in operation or until building is occupied.
- B. Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too quickly.

PART 2 - PRODUCTS

2.1 GYPSUM WALLBOARD (GWB):

- A. Types as noted on drawings, details and schedules as follows:

1. Regular Gypsum Board, tapered edge, ASTM C-36.
2. Type "X" Gypsum Board, tapered edge, ASTM C-36.
3. Water-Resistant Gypsum Backing Board, tapered edge, ASTM C-630.
4. Type "X" Water-Resistant Gypsum Backing Board, tapered edge, ASTM C-630.
5. Georgia Pacific DensShield Tile Backer, ASTM C 1178; ASTM C 630 for core.
6. Shaft Wall Liner Panels, square edge, ASTM C-36.
7. Cementitious Backer Units, ANSI A118.9: USG Durock Cement Board or Wonder-Board by Custom Building Products. PermaBase by National Gypsum Company.

B. Provide Type "X" gypsum wallboard where located in sound or fire rated partitions.

2.2 METAL FRAMING COMPONENTS:

- A. Provide 25 gauge metal studs except where noted or specified as 20 gauge. All studs not to exceed deflection limit of $L/240$.
- B. Metal Studs: Channel type, nonloadbearing, formed from electro galvanized steel, designed for screw attachment of wall materials. Provide knockouts in web of each stud and 20 gauge runner tracks with minimum 1 inch high flange for headers and securing studs at top and bottom.
- C. Hanger Wire: ASTM A641, Class 1 zinc coating, soft temper, 8 gage (0.162 inch) diameter.
- D. Tie Wire: ASTM A641, Class 1 zinc coating, soft temper, 18 gage (0.0475 inch) diameter.
- E. Grid Suspension System for Interior Ceilings: ASTM C645, manufacturer's standard direct hung grid suspension system composed of main beams and cross-furring members that interlock to form a modular supporting network.
- F. Resilient Channel: 1/2 inch deep Resilient Channel, 25 gauge galvanized steel.
- G. Deep -Leg Deflection Track: ASTM C 645 top runner with 2 inch deep flanges.
- H. Shaftwall Metal Studs: C-H or E studs formed from electro galvanized steel with matching J-runners.

2.3 ACCESSORIES:

- A. Screws: Type S, ASTM C-1002, steel drill screws at metal framing and/or Type W at wood framing. Type S-12 at 20 gauge or heavier metal framing.
- B. Screws through sheathing to be corrosion resistant.
- C. Joint Tape: ASTM C 475.
 1. Interior Gypsum Wallboard: Paper tape.
 2. Tile Backing Panels: As recommended by panel manufacturer.

- D. Joint Treatment: ASTM C 475. For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.
 - 1. Interior Locations:
 - a. Prefilling: At open joints, open or beveled panel edges, and damaged surface areas, use setting type taping compound.
 - b. Embedding and First Coat: For embedding tape and first coat on joints, fasteners and trim flanges, use setting type taping compound.
 - c. Fill Coat: For second coat use drying type all purpose compound.
 - d. Finish Coat: For third coat use drying type all purpose compound.
- E. Corner Bead: Galvanized steel; USG Dur-A-Bead No. 103, 1-1/4 inch flanges.
- F. Metal Trim (Casing Bead): USG No. 200-A galvanized steel for face finishing with joint compound.
- G. Expansion Joints: USG Control Joint No. 093, zinc with tape protected slot.
- H. Adhesive: Type to bond upon impact.
- I. Sealant: Water Resistant type sealant.
- J. Acoustical Sealant: USG Acoustical Sealant; Tremco Acoustical Sealant; Presstite Acoustical Sealant.
- K. Sound Insulation: Glass fiber or mineral wool equal to USG Thermafiber Sound Attenuation Blankets, Owens-Corning Noise Barrier Batts or Carney Sound Attenuation Blankets.

PART 3 - EXECUTION

3.1 INSTALLATION OF METAL FRAMING:

- A. Space metal studs 16 inches on center. unless otherwise noted.
- B. Install metal framing in accordance with ASTM C-754 unless otherwise specified.
- C. Secure floor and ceiling runner tracks with appropriate fasteners 2 inches from each end and spaced not to exceed 24 inches on center.
- D. Extend one runner to end of partition corner and butt other runner to it. Do not miter corners.
- E. Position full length studs vertically engaging both floor and ceiling runner.
- F. Provide two 20 gauge metal studs at each door jamb set in box configuration.
- G. Anchor all studs located adjacent to door and window frames, partition intersections and corners to ceiling and floor runner flanges by screws.

- H. Secure all other studs by stud clinching tool on both flanges of studs or by screws.
- I. Provide a slip or cushion type joint of type as recommended by stud manufacturer where ceiling track is anchored to prevent transfer of structural loads or deflection to stud system.

3.2 CEILING SUSPENSION SYSTEM INSTALLATION:

- A. Hang furring runners, with wire spaced maximum 48 inches on center vertically, from structural system. Wrap hanger wires tightly with at least 3 full turns.
- B. Interconnect runners with furring tees spaced 16 inches on center and 8 inches from end of each gypsum board panel. Provide tee adjacent to each side of fixtures not supported by a furring runner and at other ceiling penetrations requiring support.
- C. Provide additional cross framing at ceiling openings which interrupt the framing system.

3.3 WALL FURRING INSTALLATION:

- A. Secure furring channel to substrate with anchors 24 inches on center staggered on opposite flanges.

3.4 ACOUSTICAL SEALING:

- A. Seal entire perimeter of sound insulated walls with a 3/8 inch minimum bead of acoustical sealant placed at junction of framing system and abutting surface. Seal electrical boxes and any other openings or penetrations for an airtight seal.

3.5 SOUND INSULATION INSTALLATION:

- A. Apply insulation with tight butt joints to fill all void spaces and obtain a continuous sound seal. Attach to back of gypsum board in cavity with fastener driven to straddle a drywall nail with minimum of one fastener in about 3 inches from each corner and one in center of each blanket.

3.6 GYPSUM WALLBOARD INSTALLATION:

- A. Apply gypsum wallboard and finish in accordance with ASTM C-840 and GA-216 unless otherwise specified.
- B. Apply gypsum board of maximum practical length with light contact butt joints so that tapered edge joints abut and mill cut or field cut joints abut.
- C. Apply gypsum board first to ceiling and then to walls or partitions. Stagger end joints.
- D. Parallel application to be with all edge joints centered over framing members.
- E. Perpendicular application to be with wallboard of maximum practical lengths and end joints occurring over framing members.

- F. Stagger joints on opposite side of partition such that joints on both sides do not occur over the same framing member.
- G. Fasten gypsum board to framing with screws located 3/8 inch minimum to 1/2 inch maximum from edges and ends.
- H. Space screws 12 inches on center in the field and edges for perpendicular application. Space screws 12 inches on center in the field and 8 inches on center along long edges for parallel application.
- I. Space screws 12 inches on center in the field and 8 inches on center at edges of fire-rated construction.
- J. Fasten each layer of double layer application for fire rated partitions with screws as specified for single layer.
- K. Fasten first layer parallel to framing for non-rated double layer application same as specified for single layer. Apply second layer with adhesive. Provide temporary fasteners or bracing until adhesive sets.
- L. Offset joints in face layer equal to one framing member space from and parallel to joints in base layer.
- M. Adhesive apply gypsum board direct to substrates other than metal framing or gypsum wallboard in accordance with adhesive manufacturers instructions.
- N. Provide gypsum board on one side of partition studs above ceiling to floor / roof deck above.
- O. For sound and fire rated partitions, provide gypsum board on both sides of partition studs to underside of floor / roof deck above.
- P. Where partitions intersect structural members projecting below the underside of floor / roof decks, cut gypsum panels to fit profile formed by structural members; allow 1/4 inch to 3/8 inch wide joints to install sealant.

3.7 ACCESSORY INSTALLATION:

- A. Apply all accessories in accordance with manufacturers instructions.
- B. Install corner bead at all external corners.
- C. Install metal trim (casing bead) where gypsum board butts other materials and at exposed edges or ends.
- D. Where required control joints fall in door or window openings, provide control joints consisting of back to back metal trim (casing bead) from top of frame to ceiling at one corner of frame.
- E. Provide partition control joints consisting of back to back metal trim (casing beads) spaced not more than 30 feet apart.

- F. Provide ceiling control joints consisting of back to back metal trim (casing beads) spaced not more than 50 feet apart and maximum area of 2500 square feet.
- G. Apply sealant to all cut edges and nail heads of water-resistant gypsum backing panel used as base for ceramic tile.
- H. Apply regular gypsum board where scheduled gypsum board on ceilings of rooms with water-resistant gypsum backing panel walls.
- I. Provide expansion joints where noted.

3.8 FINISHING INSTALLATION:

- A. Finish all exposed joints, fastener heads, flanges of metal trim (casing beads), corner beads and other accessories with Joint Treatment in accordance with manufacturer's instructions. Finish of joints shall extend to floor to create a uniform surface whether room is scheduled to receive base or not. Finish board edges at floor to create a uniform surface whether room is scheduled to receive base or not.
- B. Fill space between gypsum board and floor with joint compound if bottom edge of gypsum board is placed more than 1/4 inch above the floor.
- C. Fill in space between outlet boxes and gypsum board with joint treatment at fire-rated partitions.
- D. Provide Joint Treatment above suspended ceilings on sound and fire-rated partitions.
- E. Levels of gypsum board finish: Provide the following levels of gypsum board finish per GA-214.
 - 1. Level 1 for ceiling plenum areas, concealed areas, and where indicated, unless a higher level of finish is required for fire-rated assemblies and sound -rated assemblies.
 - a. Embed tape in joint compound.
 - 2. Level 2 where panels form substrates for tile and where indicated.
 - a. Embed tape in joint compound and apply first coat of joint compound.
 - 3. Level 3 for gypsum board where indicated.
 - a. Embed tape in joint compound and apply first and fill (second) coats of joint compound.
 - 4. Level 4 for gypsum board surfaces, unless noted otherwise.
 - a. Embed tape in joint compound and apply first, fill (second), and finish (third) coats of joint compound over joints, angles, fastener heads, and accessories. Touch up and sand between coats and after last coat as

needed to produce a surface free of visual defects and ready for decoration.

END SECTION 09 29 00

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SECTION 09 30 00 - TILING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes the following:
1. Porcelain paver and wall Tile.
 2. Grouts.
 3. Doner wall tile (**O.F.C.I.**)
 4. Metal edge strips and transitions.
 5. Accessories.

1.3 QUALITY ASSURANCE:

- A. Tile Manufacturing Standard: TCA 137.1. Furnish tile complying with Standard Grade requirements unless indicated otherwise.
- B. Provide materials obtained from one source for each type and color of tile, grout and setting materials.

1.4 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical information and installation instructions for materials required, except bulk materials. Include certifications and other data to show compliance with these specifications.
- B. Samples: For initial selection of colors submit manufacturer's color charts consisting of actual tiles or sections of tiles showing full range of colors available, for each type of tile specified. Include samples of grout and accessories requiring color selection.
- C. For verification purposes submit the following:
1. Samples for each type of tile and color required, not less than 12 inches square, on plywood or hardboard backing and grouted.
 2. Full size samples for each type of trim, accessory and color.
 3. 6 inches long samples of marble thresholds.
 4. Samples of metal edge strip.
- D. Certification: Furnish Master Grade Certificate for each type of tile, signed by manufacturer and Installer.

1.5 PRODUCT HANDLING:

- A. Deliver packaged materials and store in original containers with seals unbroken and labels intact until time of use, in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURER:

- A. Provide products by one of the following for each type of tile.
 - 1. Porcelain Paver and Wall Tile:
 - a. Crossville Porcelain Stone/USA
 - b. Dal-Tile Corporation
 - c. Architectural Tile Solutions
 - 2. Doner Wall Tile (**O.F.C.I.**):
 - a. Product finished by Owner as manufactured by "Thats My Brick."
 - 3. Milk Parlor Wall Tile:
 - a. Fiandre Architectural Surfaces

2.2 TILE PRODUCTS:

- A. Porcelain Paver and Wall Tile: Size, color and pattern as indicated; square edge units.
 - 1. Finish: Matte glaze, where indicated.
 - 2. Provide manufacturer's square edge units.
 - 3. Size: Refer to "Schedule Of Interior Finishes."
 - 4. Characteristics:
 - a. Absorption: ASTM C373, <0.20%
 - b. Breaking strength: ASTM C648, >500 lbs.
 - c. C.O.F. wet, >0.7
 - d. C.O.F. dry, > 0.8
 - e. Hardness, MOHS, 7
 - 5. Provide manufacturer's special shapes:
 - a. Base tile.
- B. Milk Parlor Wall Tile, Fiandre: Size, color and pattern as indicated; square edge units.
 - 1. Characteristics:
 - a. Absorption: ISO 10545.3, .04% - .06%

- b. Dimensional: ISO 10545.2, Length/Width = +/- 0.1% max; Thickness = +/- 5%
- c. Abrasion: ISO 10545.6, 130 mm³
- d. Skid Resistance: DIN 5113, Passes.

2.3 MORTAR AND GROUT:

- A. Portland Cement Mortar and Grout: ANSI A 108.1.
 - 1. Color pigment: Mineral oxides, unaffected by lime, cement or weathering. Use when required to produce selected grout color.
- B. Latex Portland Cement Mortar: Latex modified Portland cement dry set mortar; ANSI A 118.4.
- C. Epoxy Mortar: Two component epoxy resin and hardener; ANSI A 118.3.
- D. Latex-Portland Cement Grout: Proprietary compound composed of Portland cement with latex additive for a more flexible and less permeable grout. Color as selected by Architect from manufacturer's standard.
 - 1. Provide product with latex additive which is compatible with latex additive in latex-Portland cement mortar.
 - 2. Products offered by manufacturers to comply with requirements include the following:
 - a. Hydroment Ceramic Tile Grout Joint Filler with Acrylic Latex Additive #425: Bostik.
 - b. Latex Modified Floor Grout: L&M-Surco Manufacturing, Inc.(floors only)
 - c. Laticrete Dry Bond: Laticrete International, Inc.
- E. Epoxy Grout: Two-component epoxy grout complying with ANSI A118.3. Color as selected by Architect from manufacturer's standard.
 - 1. Products offered by manufacturers to comply with requirements include the following:
 - a. U-poxy/AAR II; Upco Company/USM Corporation
 - b. LBM Epoxy Mortar and Grout; L&M-Surco Manufacturing, Inc.
- F. Organic Adhesive: ANSI A 136.1; of proper type for intended use with respect to moisture resistance, tile material and backing as certified by adhesive manufacturer.

Provide primer-sealer where recommended by manufacturer.
- G. Epoxy Adhesive: Two-component epoxy resin and hardener; TCA formula C-150.
- H. Grout Sealer: Provide clear, water-based acrylic sealer. "CeramaSeal Grout Sealer" as manufactured by Bostik or Architect approved equal.

2.4 METAL EDGE STRIPS AND TRANSITIONS:

- A. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic designed specifically for flooring applications, stainless steel; ASTM A 666, 300 Series exposed-edge material.
- B. Tile Expansion and Control Joints for Thin-Set Applications:
 - 1. Provide expansion joints where shown or if not shown locate in accordance with TCA Handbook, specifications and ANSI A108, Application Notes AN-3.7.
 - 2. Roll-formed stainless steel; lateral trapezoidal-perforated anchoring legs, side sections, and interlocking top sections with tongue-and-groove design to allow for horizontal movement, 15/32 inch visible surface; as follows:
 - a. Height: As required to suit application.
 - b. Length: 8 foot long (nominal)increments.
 - c. Product: Schlüter®-DILEX-EDP or Architect approved equal.
- C. Wall Caps and Corner Transitions:
 - 1. Schluter Systems, "RONDEC" system.
 - 2. Material: Type 304 Stainless Steel.
 - 3. Provide wall caps, joiners, inside and outside corners and end cap components sufficient to result in a complete finished appearance.
 - 4. Provide in thicknesses appropriate for each thinset tile condition and tile thickness.
- D. Inside Corner Trim For Walls and Wall To Floor Transitions:
 - 1. Schluter Systems, "DILEX-EHK" system.
 - 2. Material: Type 304 Stainless Steel.
 - 3. Provide inside corner components and end caps sufficient to result in a complete finished appearance.
 - 4. Provide in thicknesses appropriate for each thinset tile condition and tile thickness.
- E. Aluminum "S" trim for tiling:
 - 1. Provide mill finish or clear anodized "S" trim with leg size as indicated in the drawing details.
 - 2. Secure to wall system with stainless steel screws

2.5 ACCESSORIES:

- A. Temporary Protective Coating: Either product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.
 - 1. Petroleum paraffin wax, fully refined and odorless, containing at least 0.5 percent oil with a melting point of 120 to 140 deg F per ASTM D 87.

2. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.
- B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

PART 3 - EXECUTION

3.1 TILE INSTALLATION STANDARDS:

- A. ANSI Standards: Comply with applicable requirements of the following, except as otherwise indicated.
1. ANSI A108.5: Tile installed with dry set Portland cement mortar or latex-Portland cement mortar.
 2. ANSI A108.6: Tile installed with epoxy mortar.
- B. Comply with manufacturer's instructions for mixing and installation of proprietary materials.

3.2 INSTALLATION:

- A. Extend tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.
- B. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures and other penetrations so that plates, collars or covers overlap tile.
- C. Placement of coved wall base: Where coved wall base is provided, install base first and then field tile shall be set having top surface level with tangent point of cove radius. Do not set cove base on top of field tile.
- D. Placement Methods: Install tile using the following setting beds as shown or scheduled. If not otherwise indicated, use Portland cement mortar where thickness and substrate permits.
1. Thin-Set Installations:
 - a. Dry set Portland cement mortar or latex-Portland cement mortar.
 - b. Organic adhesive.
 - c. Conductive dry set Portland cement mortar.
 - d. Epoxy adhesive.
 2. Chemically Resistant Installations:

- a. Epoxy Mortar.
- E. Jointing Pattern: Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are same size. Layout tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise shown.
- F. Expansion and Control Joints: Provide openings for joints where shown and to comply with details, or, if not shown and detailed, to comply with recommendations in TCA "Handbook for Ceramic Tile Installation". Sealant work is specified in Division 7.
- G. Grout:
 - 1. Use latex-Portland cement grout where shown or scheduled.
 - 2. Use epoxy grout where shown or scheduled.
- H. Metal Edge Strips: Provide where shown and where exposed edge of ceramic tile flooring is to meet carpet, wood or other resilient floor covering.
- I. Grout Sealer: Apply grout sealer in accordance with manufacturer's instructions.

3.3 CLEANING AND PROTECTION:

- A. Cleaning:
 - 1. Upon completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 2. Unglazed tile may be cleaned with acid solutions only when permitted by tile and grout manufacturer's printed instructions, but not sooner than 14 days after installation. Protect metal surfaces, cast iron and vitreous plumbing fixtures from effects of acid cleaning. Flush surface with clean water before and after cleaning.
- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded or otherwise defective tile work.
- C. Protection:
 - 1. When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with Kraft paper or other heavy covering during construction period to prevent damage and wear.
 - 2. Prohibit foot and wheel traffic from using tiled floors for at least 3 days after grouting is completed.
 - 3. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END SECTION 09 30 00

SECTION 09 51 00 - ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes the following:
 - 1. Ceilings composed of acoustical panels and exposed suspension system.
 - 2. Ceilings composed of vinyl faced gypsum board and exposed suspension system.
 - 3. Linear Acoustic Hanging Baffles.
- B. Related work of other sections:
 - 1. 09 91 00 for painting of acoustic baffles.

1.3 QUALITY ASSURANCE:

- A. All acoustic materials shall have Flame Spread Rating of 0-25 when tested in accordance with ASTM E-84.

1.4 SUBMITTALS:

- A. Submit two samples of each acoustic material for approval.

1.5 JOB CONDITIONS:

- A. Maintain temperature and humidity conditions before, during, and after installation closely approximating interior conditions which will exist when building is occupied.

PART 2 - PRODUCTS

2.1 MANUFACTURER:

- A. Provide products from the following:
 - 1. Armstrong World Industries, Inc.
 - 2. Certaineed
 - 3. USG Interiors, Inc.
 - 4. Capaul Corporation

2.2 HUMIDITY RESISTANT ACOUSTIC PANELS:

- A. ACP-2: 24 inches x 24 inches x 5/8 inch embossed vinyl faced, gypsum wallboard core, moisture resistant lay-in panel, min. CAC 40 with fine textured white factory finish. Similar to Armstrong No. 868.

2.3 GLASS FIBER ACOUSTIC PANELS:

- A. ACP-3: 24 inches x 24 inches x 1 inch glass fiber lay-in panel, 9/16 inch square tegular edge, NRC 0.90, CAC 26 with white acoustically transparent membrane covering. Similar to Armstrong No. 3355.

2.4 SUSPENSION SYSTEMS:

- A. Conform to all requirements of ASTM C-635 intermediate structural classification.
- B. Provide all hanger inserts and anchors for supporting systems.
- C. Color match exposed trim and accessories to suspension system.

2.5 EXPOSED GRID SUSPENSION SYSTEM:

- A. Provide following system for acoustic panels type ACP-2.
 - 1. 15/16 inch face, snap type of formed electro-galvanized steel main runners and cross tees, capped with aluminum. Finish of runners, cross tees and wall moldings to be factory applied of color to match the acoustic panel.
- B. Provide following system for acoustic panels type ACP-3.
 - 1. 9/16 inch face, snap type of formed electro-galvanized steel main runners and cross tees. Finish of runners, cross tees and wall moldings to be factory applied of color to match the acoustic panel.

2.6 MISCELLANEOUS MATERIALS:

- A. Hanging Wire: 12 gauge ASTM A-641 galvanized steel soft temper.
- B. Hanging Wire for Humidity Resistant Acoustic Materials: 9 gauge aluminum or 12 gauge stainless steel.
- C. Hold-Down Clips: Manufacturers standard concealed spring steel.
- D. Acoustic Sealant: Heavy bodied, non-shrinking, nondrying, nonsag acoustical sealant.

2.7 LINEAR ACOUSTIC HANGING BAFFLES (ACP-1):

- A. Basis-Of-Specification manufacturer and product
 - 1. Tectum, Inc., cementitious wood-fiber acoustical hanging baffles:
 - a. Material: Wood-fiber with proprietary binder of mineral components.

- b. Thickness: 2 inches.
 - c. Sizes: Refer to "Schedule Of Interior Finishes."
 - d. Finish: Natural for field painting by 09 91 00.
 - e. Top edge provided with integral hanging holes.
- B. Subject to compliance with requirements provide specified product or Architect pre-approved equal.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Verify that conditions are proper for installation of acoustic materials.

3.2 GENERAL INSTALLATION:

- A. Conform to installation requirements of ASTM C-636 and reflected ceiling plans.
- B. Suspend hang wires from building structural members. Locate hanger near each end and spaced 4 feet-0 inches along runner or carrying channel. Level to 1/8 inch in 12 feet-0 inches.
- C. Install acoustical units in a true and even plane, in straight line and courses laid out symmetrically about center lines of ceiling or panel with border units of half width or greater.
- D. Install in accordance with the specifications and instructions of the manufacturer of the suspension system.
- E. Space hangers, runners and tees to prevent deflection in excess of 1/360 of the span of any member.
- F. Install wire hangers vertically.
- G. Cut and fit all materials with straight, true, even lines.

3.3 EXPOSED GRID SYSTEM INSTALLATION:

- A. Provide metal edge moldings where acoustical materials abut vertical surfaces or other materials. Secure 16 inches on center and 3 inches from each end. Miter all corners.
- B. Provide hold down clips at time-rated ceilings if manufacturers system requires clips.
- C. Field cut reveal edge on panels at wall edge moldings.
- D. Apply continuous acoustic sealant bead on back of vertical leg of wall edge molding before installing molding.

3.4 ACOUSTICAL BAFFLE INSTALLATION:

A. Refer to the details in the drawings. Comply with manufacturer's printed instructions.

3.5 REPLACEMENT PANELS:

A. Furnish 20 additional pieces of each type and size of lay-in panels. Store in cartons in area where directed.

3.6 CLEANING:

A. Clean exposed surfaces of acoustical material and grid systems and touch up minor finish damage. Replace materials which can not be repaired to new condition.

END SECTION 09 51 00

SECTION 09 54 29 - SUSPENDED PVC CEILINGS

PART 1- GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 SECTION INCLUDES

- A. Suspended PVC ceiling system.

1.3 RELATED SECTIONS

- A. Section 09 51 00 – Acoustical Ceilings.

1.4 REFERENCE STANDARDS

- A. ASTM D 3273 – Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- B. ASTM D 3274 – Standard Test Method for Evaluating Degree of Surface Disfigurement of Paint Films by Fungal or Algal Growth, or Soil and Dirt Accumulation.
- C. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
- D. ISO 9001:2008 – Quality Management Systems – Requirements.

1.5 SUBMITTALS

- A. Comply with Section 01 33 00 – Submittal Procedures.
- B. Product Data: Submit manufacturer’s product data, including installation instructions.
- C. Shop Drawings: Submit manufacturer’s shop drawings, including plans, elevations, sections, and details, indicating dimensions, tolerances, materials, components, fabrication, fasteners, finish, options, and accessories.
- D. Samples: Submit manufacturer’s sample of suspended ceiling panels.
 - 1. Size: Minimum 6 inches long by panel width.
- E. Manufacturer’s Certification: Submit manufacturer’s certification that materials comply with specified requirements and are suitable for intended application.
- F. Manufacturer’s Project References: Submit manufacturer’s list of successfully completed suspended ceiling system projects, including project name and location, name of architect, and type and quantity of suspended ceiling system furnished.

- G. Cleaning Instructions: Submit manufacturer's cleaning instructions.
- H. Warranty Documentation: Submit manufacturer's standard warranty.

1.6 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
 - 1. Manufacturer regularly engaged, for past 20 years, in manufacture of suspended ceiling systems of similar type to that specified.
 - 2. ISO 9001:2008 QMS certified company.
- B. Installer's Qualifications:
 - 1. Installer regularly engaged, for past 5 years, in installation of suspended ceiling systems of similar type to that specified.
 - 2. Employ persons trained for installation of suspended ceiling systems.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage and Handling Requirements:
 - 1. Store and handle materials in accordance with manufacturer's instructions.
 - 2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
 - 3. Store materials in clean, dry area indoors.
 - 4. Do not store materials near sources of heat.
 - 5. Do not store materials directly on floor.
 - 6. Store materials on flat, level surface, raised above floor, with adequate support to prevent sagging.
 - 7. Protect materials and finish during storage, handling, and installation to prevent damage.

1.8 AMBIENT CONDITIONS

- A. Cold Temperatures: Warm panels to a minimum of 60 degrees F (16 degrees C) overnight before field-cutting in ambient temperatures below 40 degrees F (4 degrees C).
- B. Warm Temperatures: Cool panels to a minimum of 60 degrees F (16 degrees C) overnight before installing panels in ambient temperatures above 70 degrees F (21 degrees C).

1.9 WARRANTY

- A. Conditional Warranty Period:
 - 1. Ceiling Panels: 10 years.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Manufacturer: Extrutech Plastics, Inc., 5902 West Custer Street, Manitowoc, Wisconsin 54220. Toll Free 888-818-0118. Phone 920-684-9650. Fax 920-684-4344. Website www.epiplastics.com. E-mail info@epiplastics.com.

2.2 SUSPENDED PVC CEILINGS

- A. Ceiling Panels: "CP2400".
1. Description: Reversible, waterproof, washable, rib-reinforced, rigid, grid panels for standard metal or fiberglass ceiling grid systems with 24-inch centers.
 2. Material: 100 percent virgin, exterior-grade PVC.
 - a. Recyclable Content: 100 percent.
 3. Outside Surface: Flat.
 4. Thickness: 3/8 inch (9.5 mm).
 5. Nominal Panel Size:
 - a. As indicated on the Drawings.
 6. Unit Weight: 0.625 psf.
 7. Fungus Resistance, ASTM D 3273 and D 3274: No mold or mildew growth.
 8. Surface Burning Characteristics, ASTM E 84: Class A.
 - a. Flame Spread Index: 10.
 - b. Smoke Developed Index: 350.
 9. Nonporous.
 10. Waterproof.
 11. Corrosion proof.
 12. Termite resistant.
 13. Does not conduct heat or electricity.
 14. Acceptance:
 - a. USDA.
 15. Color: Bright White.
 16. Finish: Smooth, high gloss, reflective.

2.3 FABRICATION

- A. Shop Fabrication: Shop-cut ceiling panels to required lengths.

2.4 ACCESSORIES

- A. Grid Components:

1. Material: Pultruded fiberglass reinforced plastic.
 2. Wall, Connector, and Panel Hold-Down Clips: PVC.
 3. Runner Face: 1-3/8 inches.
 4. Perimeter Trim Face: Wall angle, 1-3/8 inches.
 5. Acceptance: USDA.
 6. Surface Burning Characteristics, ASTM E 84: Class A.
 - a. Flame Spread Index: 15.
 - b. Smoke Developed Index: 200.
- B. Tie Wire: 12-gauge galvanized steel wire.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to receive suspended ceiling system.
- B. Notify Architect of conditions that would adversely affect installation or subsequent use.
- C. Do not begin installation until unacceptable conditions are corrected.

3.2 PREPARATION

- A. Prepare surfaces in accordance with manufacturer's instructions.

3.3 INSTALLATION

- A. Install suspended ceiling system in accordance with manufacturer's instructions at locations indicated on the Drawings.
- B. Install suspended ceiling system plumb, level, square, flat, and in proper alignment.
- C. Install suspended ceiling system to be washable.
- D. Install grid components in accordance with manufacturer's instructions.
- E. Use fasteners in accordance with manufacturer's instructions to install suspended ceiling system securely to supports.

3.4 ADJUSTING

- A. Remove and replace with new material, damaged components that cannot be successfully repaired, as determined by Architect.

3.5 CLEANING

- A. Clean suspended ceiling system promptly after installation in accordance with manufacturer's instructions.

B. Do not use harsh cleaning materials or methods that could damage finish.

C. Do not use abrasive cleaners.

3.6 PROTECTION

A. Protect installed suspended ceiling system from damage during construction.

END SECTION 09 54 29

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SECTION 09 65 00 - RESILIENT FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes the following:
 - 1. Vinyl Composition Tile
 - 2. Resilient Base

1.3 QUALITY ASSURANCE:

- A. Manufacturer:
 - 1. Wherever possible, provide required resilient flooring and accessories produced by a single manufacturer.
- B. Fire Test Performance: Unless otherwise indicated, provide resilient flooring having the following classifications or properties when tested in accordance with the standard fire tests referenced below:
 - 1. Critical Radiant Flux: Not less than the following rating as per ASTM E 648.
 - a. 0.45 watts per sq. cm.
 - b. 0.22 watts per sq. cm.
 - 2. Flame Spread: Not more than 75 as per ASTM E 84.
 - 3. Smoke Developed: Not more than 450 as per ASTM E 84.
 - 4. Smoke Density: Not more than 450 as per NFPA 258.
- C. Provide testing of concrete slab substrate in accordance with ASTM F-1869, "Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloors Using Anhydrous Calcium Chloride". Test results shall be acceptable to the flooring manufacturer's requirements prior to flooring installation. Test results shall be submitted to the Contractor and the A/E prior to starting installation.

1.4 REFERENCES:

- A. RFCI Vinyl Sheet Standard: SV-1, Resilient Floor Covering Institute Recommended Specification for Resilient Floor Covering Vinyl Plastic Sheet.

1.5 SUBMITTALS:

- A. Product Data: Submit 2 copies of manufacturer's technical data and installation instructions for each type of resilient flooring and accessory.
- B. Samples:
 - 1. Submit, for verification purposes, samples of each type, color and pattern of resilient flooring including accessories required indicating full range of color and pattern variation. Provide full size tile units, 6 inch x 9 inch samples of sheet flooring and 2-1/2 inches long sections of resilient flooring accessories.
 - 2. For initial selection of colors and patterns submit, prior to above, samples in form of actual sections of resilient flooring including accessories showing full range of colors and patterns available for each type of resilient flooring required.
- C. Certification for Fire Test Performance: Submit manufacturer's certification that resilient flooring furnished for areas indicated complies with required fire test performance and has been tested and meets indicated requirements.
- D. Maintenance Instructions: Submit two copies of manufacturer's recommended maintenance practices for each type of resilient flooring and accessory required.
- E. Replacement Material: After completion of work deliver to project site replacement materials from same manufactured lot as materials installed and as follows:
 - 1. Tile flooring, not less than one box for each 50 boxes or fraction thereof, for each type, size and color installed.
 - 2. Sheet flooring, not less than 5 linear yards for each type, pattern and color installed.

1.6 JOB CONDITIONS:

- A. Maintain minimum temperature of 70 degrees F in spaces to receive resilient flooring for at least 48 hours prior to installation, during installation and for not less than 48 hours after installation. Subsequently, maintain minimum temperature of 55 degrees F in areas where work is completed.
- B. Install resilient flooring and accessories after other finishing operations, including painting, have been completed. Moisture content of concrete slabs and environmental conditions must be within limits recommended by manufacturer of products being installed.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. Manufacturer: Subject to compliance with requirements, provide products by one of the following which are equal to the Basis-Of-Specification Manufacturers and products designated in the "Schedule Of Interior Finishes"
 - 1. Vinyl Composition Tile:

- a. AB ColorPlus, American Biltrite (Canada) Ltd.
- b. Armstrong World Industries, Inc.
- c. Congoleum Corporation.
- d. Mannington Mills, Inc.
- e. Tarkett, Inc.
- f. VPI, LLC; Floor Products Division.

2. Wall Base:

- a. Allstate Rubber Corp.; Stoler Industries.
- b. Armstrong World Industries, Inc.
- c. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
- d. Endura Rubber Flooring; Division of Burke Industries, Inc.
- e. Estrie Products International; American Biltrite (Canada) Ltd.
- f. Flexco, Inc.
- g. Johnsonite.
- h. Mondo Rubber International, Inc.
- i. Musson, R. C. Rubber Co.
- j. Nora Rubber Flooring; Freudenberg Building Systems, Inc.
- k. PRF USA, Inc.
- l. Roppe Corporation, USA.
- m. VPI, LLC; Floor Products Division.

2.2 MATERIALS:

- A. Colors and Patterns: As shown or scheduled or as selected by Architect from manufacturer's standards.
- B. Tile Flooring:
 - 1. Vinyl Composition Tile: FS SS-T-312, Type IV; 12 inch x 12 inch unless otherwise indicated and as follows:
 - a. Composition 1 - asbestos free.
 - b. Gage: 3/32 inch
- C. Accessories:
 - 1. Resilient Base: Provide base complying with FS SS-W-40; either Type I rubber or Type II vinyl, with matching end stops and preformed or molded corner units and as follows:
 - a. Height: 4 inches.
 - b. Thickness: 1/8 inch gage.
 - c. Style: Straight base with cove at hard floor finish.
 - 2. Resilient Edge Strips: 1/8 inch thick, homogeneous vinyl or rubber composition, tapered or bullnose edge, color to match flooring or as selected by Architect from standard colors available; not less than 1 inch wide.
 - 3. Adhesives (Cements): VOC compliant, asbestos free, stabilized type as

- recommended by flooring manufacturer to suit material and substrate conditions.
4. Concrete Slab Primer: Nonstaining type as recommended by flooring manufacturer.
 5. Leveling Compound: Latex type as recommended by flooring manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION:

- A. Broom clean or vacuum surfaces to be covered and inspect subfloor. Start of flooring installation indicates acceptance of subfloor conditions and full responsibility for completed work.
 1. Use leveling compound as recommended by flooring manufacturer for filling small cracks and depressions in subfloors.
 2. Perform moisture tests on concrete slabs to determine that concrete surfaces are sufficiently cured and ready to receive flooring.
 3. Apply concrete slab primer, if recommended by flooring manufacturer, prior to application of adhesive. Apply in compliance with manufacturer's directions.

3.2 INSTALLATION:

- A. General:
 1. Place flooring with adhesive cement in strict compliance with manufacturer's recommendations. Butt tightly to vertical surfaces, thresholds, nosing and edgings. Scribe around obstructions to produce neat joints, laid tight, even and straight. Extend flooring into toe spaces, door reveals and into closets and similar openings.
 2. Maintain reference markers, holes or openings that are in place or plainly marked for future cutting by repeating on finish flooring as marked on subfloor. Use chalk or other nonpermanent marking device.
 3. Maintain overall continuity of color and pattern with pieces of flooring installed in these covers. Tightly cement edges to perimeter of floor around covers and to covers.
 4. Tightly cement flooring to subbase without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks or other surface imperfections. Hand roll flooring at perimeter of each covered area to assure adhesion.
- B. Tile Floors:
 1. Lay tile from center marks established with principal walls, discounting minor offsets, so that tile at opposite edges of room are of equal width. Adjust as necessary to avoid use of cut widths less than 1/2 tile at room perimeters. Lay tile square to room axis, unless otherwise shown.
 2. Match tiles for color and pattern by using tile from cartons in same sequence as manufactured and packaged. Cut tile neatly around all fixtures. Broken, cracked, chipped or deformed tiles are not acceptable.

a. Lay tile with grain running in one direction.

C. Accessories:

1. Apply resilient base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required. Install base in lengths as long as practicable with preformed corner units or fabricated from base materials with mitered or coped inside corners. Tightly bond base to backing throughout length of each piece with continuous contact at horizontal and vertical surfaces.
2. On masonry surfaces or other similar irregular surfaces fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
3. Place resilient edge strips tightly butted to flooring and secure with adhesive. Install edging strips at edges of flooring which would otherwise be exposed.

3.3 CLEANING AND PROTECTION:

- A. Remove any excess adhesive or other surface blemishes using neutral type cleaners as recommended by flooring manufacturer. Protect installed flooring with heavy Kraft paper or other covering.
- B. Finishing: After completion of project and just prior to final inspection of work, thoroughly clean floors and accessories.
- C. Apply polish and buff, with type of polish, number of coats and buffing procedures in compliance with flooring manufacturer's instructions.

END SECTION 09 65 00

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SECTION 09 91 00 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes:

- 1. Surface preparation, painting, and finishing of new exposed interior and exterior items and surfaces, unless otherwise noted or specified.
- B. Surface preparation, priming, and finish coats specified in this section are in addition to shop-priming and surface treatment specified under other sections.

1.3 RELATED WORK:

- A. Factory finished items will not require painting or finishing unless otherwise specified. Refer to technical sections for items to be furnished with a factory finish.
- B. Prime coat will be factory applied on certain items. Refer to various technical sections for items to be furnished with a factory prime coat.
- C. Nonferrous metal items will not require painting or finishing unless otherwise specified.
- D. Identification of mechanical piping and electrical conduit will be done by respective contractors.

1.4 QUALITY ASSURANCE:

- A. Materials shall be of manufacture, brand and quality as specified. Products of other manufacturers will not be accepted. Provide block fillers, primers and undercoat materials produced by the same manufacturer as the finish coats. All system components shall be compatible with one another and with substrates, as demonstrated by manufacturer based on testing and field experience.
- B. Quality workmanship is required. Employ skilled craftsmen experienced in the use of the product involved with a record of successful service performance.

1.5 MOCK-UP:

- A. Prepare and finish a sample room, complete or in part, as directed for approval.

- A. Prepare and finish a benchmark sample (mock-up) of each type of coating and substrate required on project (as listed below). Comply with procedures specified in PDCA P5. Duplicate finish of approved prepared samples.
- B. The Architect will select one room or surface to represent surfaces and conditions for each type of coating and substrate to be painted.
- C. After permanent lighting and other environmental services have been activated, apply coatings in this room or to each surface according to the schedule, and as specified. Provide required sheen, color and texture on each surface.
- D. Accepted room or surface will be used as a standard for workmanship for similar areas or items throughout the project.

1.6 SUBMITTALS:

- A. Product Data: Provide manufacturer's technical information, including label analysis and instructions for handling, storing and applying each coating material proposed for use. Include data for all components of each system specified, including fillers, primers, etc. Cross-reference each proposed material to finish system specified.
- B. Certification: Provide certification by manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
- C. Submit two sample panels of each type finish system for color and texture approval. Label each sample as to finish system.
- D. Manufacturer Material Safety Data Sheets for all materials which are not water based shall be readily accessible at the construction site at all times that materials are present at the site.

1.7 DELIVERY, STORAGE & HANDLING:

- A. Deliver paint ready-mixed to job site in manufacturer's original sealed containers with labels intact.
- B. Store materials not in use in tightly covered containers in an approved well-ventilated area at a minimum ambient temperature of 45 degrees F. Maintain containers used in storage in a clean condition, free of foreign materials and residue. Provide adequate floor protection.
- C. Remove oily or soiled rags and waste daily or store in sealed metal containers.

1.8 JOB CONDITIONS:

- A. Paint only in areas which are clean and free of dust.
- B. Do not apply materials until moisture content of surface is less than 12 percent as determined by moisture testing meter.

- C. Do not apply materials on exterior surfaces during rainy or frosty weather or when temperature is below 50 degrees F.
- D. Do not apply materials on surfaces while they are exposed to the sun.

PART 2 - PRODUCTS

2.1 COLORS AND FINISHES:

- A. Refer to Schedules in the drawings for colors.
- B. For estimating and bidding purposes, assume that each room will have one wall color and the ceiling painted a different color.

2.2 MATERIALS:

- A. Provide all materials necessary, as recommended by coating manufacturer, for successful performance of coating system on indicated substrate, whether all components are specified herein or not. Materials shall include, but not be limited to, fillers, barrier coats, primers, undercoats, and finish coats.
- B. Select manufacturer and product from following list using materials of same manufacturer for each finish. Provide special tinted primer in lieu of scheduled primer for accent or deep tone colors.

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TYPE "A" MATERIAL

- + Benjamin Moore Super Hide, 284
- + Diamond Vogel PVA Primer/Surfacer, DU-1520
- + Hallman Lindsay..... Pro-Kote Latex Wall Primer, 227
- + Mautz 60 One Hour Latex Primer
- + PPG..... 6-2 Quick Dry Primer Sealer
- + Pratt & Lambert..... SuPrime Interior Wall Primer, Z1004
- + Sherwin Williams Prep-Rite Latex Wall Primer B28W200

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TYPE "B" MATERIAL

- + Benjamin Moore Super Spec Latex Block Filler, 285
- + Diamond Vogel Dia-Pro Acrylic Block Filler, BF-1515
- + Hallman Lindsay..... Block Kote Latex Interior Block Filler, 184
- + Mautz 8-55 Latex Block Filler
- + PPG..... Masonry Block Filler 6-7
- + Pratt & Lambert..... Pro-Hide Silver Block Filler, Z8485
- + Sherwin Williams Prep-Rite Block Filler B25W25

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TYPE "D" MATERIAL

- + Benjamin Moore Acrylic Metal Primer, M04
- + Diamond Vogel V-Cote 200 Maintenance Primer/Finish, MC-1501
- + Hallman Lindsay..... Metalguard QD Alkyd Rust Inhibitive Primer, 330

- + Mautz 49-51 DTM Cryl through 49-54 DTM Cryl
- + PPG Speedhide Galvanized Primer 6-209
- + Pratt & Lambert SteelTech Acrylic Prime, Z190
- + Sherwin Williams Pro-Cryl Primer B66_310

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TYPE "E" MATERIAL

- + Benjamin Moore Alkyd Metal Primer, M06
- + Diamond Vogel Cote-All Multi-purpose Alkyd Metal Primer, AZ-0400
- + Hallman Lindsay Metalguard QD Alkyd Rust Inhibitive Primer, 330
- + Mautz 89-00 Industrial Enamel
- + PPG 6-204 Speedhide Zinc Chromate Primer
- + Pratt & Lambert SteelTech Rust Inhibitive Metal Primer, S4500 Series
- + Sherwin Williams S-W KemBond HS B50Z

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TYPE "J" MATERIAL

- + Benjamin Moore Super Spec 100% Acrylic Exterior Satin, 184
- + Diamond Vogel Weather Plate Exterior 100% Acrylic Latex Gloss. BH-Series
- + Hallman Lindsay Weatherguard 100% Acrylic Satin, 172
- + Mautz 23-30 Super Satin Latex
- + PPG 78 Sun-Proof Latex House & Trim
- + Pratt & Lambert Red Seal Satin Latex House & Trim Paint, Z3100 Series
- + Sherwin Williams A-100 Satin Latex House & Trim A82

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TYPE "L" MATERIAL

- + Benjamin Moore Super Spec Latex Eggshell Enamel, C274
- + Diamond Vogel Permacryl Interior Latex Eggshell Enamel, DE-Series
- + Hallman Lindsay Wonder Kote Latex Eggshell Enamel, 270
- + Mautz 43-00 Interior Latex Eggshell Enamel
- + PPG 6-411 Speedhide Latex Eggshell Enamel
- + Pratt & Lambert Accolade Velvet Interior 100% Acrylic Paint, PZ4000 Series
- + Sherwin Williams Pro-Mar Latex Eg-Shel Enamel B20

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TYPE "O" MATERIAL

- + Benjamin Moore Impervo High-Gloss Enamel #133
- + Diamond Vogel Cote-All Multi-purpose Alkyd Gloss Enamel, AZ-Series
- + Hallman Lindsay Duraguard Hi-Solids Urethane Gloss Enamel, 311
- + Mautz Industrial Enamel 89-11
- + PPG 54 Kine, Quick Dry Enamel
- + Pratt & Lambert Red Seal Interior/Exterior Oil Gloss Enamel, S1100 Series
- + Sherwin Williams Industrial Enamel 89-11

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TYPE "P" MATERIAL

- + Benjamin Moore Satin Impervo Enamel, C235
- + Diamond Vogel Satinamel Interior/Exterior Alkyd Satin Enamel, CS-Series
- + Hallman Lindsay Duraguard Hi-Solids Urethane Alkyd Eggshell Enamel, 276
- + Mautz Deluxe Eggshell 755

- + PPG..... 6-90 Speedhide Lo-Luster Enamel
- + Pratt & Lambert..... Red Seal Interior Oil Eggshell Enamel, S7700 Series
- + Sherwin Williams Pro-Mar Alkyd Eg-Shel Enamel B33

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TYPE "Q" MATERIAL

- + Benjamin Moore..... Polyamide Epoxy Semi-Gloss Coating, M36/M38
- + Diamond Vogel V-Tech 240 Thin Film Epoxy, LF-1241
- + Hallman Lindsay..... Epoxy Kote Polyamid Enamel, 545
- + Mautz Epoxy Enamel I97-00
- + PPG..... 95-1 Aquapon Polyamide Epoxy
- + Pratt & Lambert..... Palgard Epoxy Coating, S3400 Series
- + Sherwin Williams Tile-Clad II Enamel B62

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TYPE "R" MATERIAL

- + Benjamin Moore..... Waterborne Urethane Semi-Gloss Finish, M73S
- + Hallman Lindsay..... Waterbourne Acrylic Gloss Epoxy, Acryguard, 542
- + Mautz Epoxy Enamel 966, 968G & 9675
- + PPG..... 95-1000 Aquapon Polyamide Clear Epoxy
- + Pratt & Lambert..... Palgard Epoxy Clear Coating, S3415 Series
- + Sherwin Williams Tile-Clad High Solids B62Z

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TYPE "U" MATERIAL

- + Benjamin Moore..... Super Spec® Sanding Sealer, C267
- + Diamond Vogel Old Master's Polyurethane Sanding Sealer
- + Hallman Lindsay..... Spray Kote Sanding Wood Sealer, V-372
- + Mautz V-105 Sanding Wood Sealer
- + PPG..... 77-30 Rez Quick Dry Sanding Sealer
- + Pratt & Lambert..... Sanding Sealer, H40
- + Sherwin Williams Wood Classics Polyurethane Satin Varnish A67F1

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TYPE "V" MATERIAL

- + Benjamin Moore..... Benwood finishes varnish, 419
- + Diamond Vogel Old Master's Satin Polyurethane
- + Hallman Lindsay..... Clearguard Urethane Satin Clear, V-368
- + Mautz V-234 Vi-Ray Urethane Stain
- + PPG..... 77-89 Rez Urethane Satin Clear
- + Pratt & Lambert..... Varmor Urethane Satin Clear Finish, R11 Series
- + Sherwin-Williams..... WoodClassics Polyurethane Satin Varnish A67F1

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TYPE "X" MATERIAL

- + Benjamin Moore..... Sweep-Up Spray Alkyd Eggshell, M52
- + Diamond Vogel V-Tech 355 Low Odor/High Hide Dri-Mist Eggshell, LB-1604
- + Hallman Lindsay..... Drop Dry Alkyd Interior Eggshell, 242
- + Mautz I-1050 Spray-Brite
- + PPG..... 6-161 Speedhide Dry Fog Spray
- + Pratt & Lambert..... Enducryl Oil Dry Flat Z5900 Series, SG Z5900 Series

+ Sherwin Williams Super Save-Lite Alkyd Dryfall S/G B47W62

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TYPE "Y" MATERIAL

+ Sherwin Williams ArmorSeal® Floor-Plex™ 7100 Water Based Epoxy Primer

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TYPE "Z" MATERIAL

+ Sherwin Williams ArmorSeal® Floor-Plex™ 7100 Water Based Epoxy

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TYPE "EE" MATERIAL

+ Benjamin Moore Moorlastic 100% Acrylic Elastomeric Waterproof Flat 056

+ Hallman Lindsay Proof Kote Heavy Duty Clear, V-335

+ PPG 95-217 Waterproofing Block Filler

+ Pratt & Lambert Elastomeric Exterior Latex, Z6000 Series

+ Sherwin-Williams Heavy Duty Block Filler B42W46

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Examine substrates, areas and conditions under which painting will be performed for:
 - 1. Defects which cannot be corrected by the procedures specified under Surface Preparation.
 - 2. Compliance with paint application requirements.
- B. Notify Contractor of surfaces requiring corrective work prior to painting.
- C. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
- D. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.
- E. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

3.2 SURFACE PREPARATION:

- A. Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting.
- B. Protect, with suitable protective material, all finished surfaces and items, and existing surfaces and items not scheduled to be painted, that occur in close proximity of the area being painted.

- C. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- D. Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.
- E. Clean and prepare each particular substrate by appropriate methods to proper condition to receive paint according to manufacturer's written instructions. Provide barrier coats over incompatible primers, or remove and reprime.
- F. Clean and prepare existing, previously coated surfaces as recommended by manufacturer for specific condition and type of each existing coating.
- G. Dull existing glossy surfaces by light sanding or washing with Tri-Sodium Phosphate.
- H. Fill all holes, scratches, cracks or other irregularities with patching material.
- I. Touch up abraded factory applied shop prime coat before applying finish coats. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.
- J. Prime metal corner and casing beads with an alkyd enamel underbody where water-thinned finish coats are specified.
- K. Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.
- L. Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove "white rust" by wire brushing. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
- M. Clean aluminum surfaces with mineral spirits.
- N. Clean wood surfaces of dirt, oil and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and remove sanding dust.
- O. Prime, stain or seal wood to receive paint or transparent finish immediately on delivery. Prime edges, ends, faces, undersides, and backsides of wood, including cabinets, counters, cases, and paneling.
- P. Remove loose particles and mortar spatters from concrete masonry units with a fiber bristle brush. Remove efflorescence, dust, dirt, grease or other foreign substances as recommended by manufacturer.

- Q. Determine alkalinity and moisture content of cementitious surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's written instructions.
- R. Special preparation for exposed steel columns in Building "A":
1. Surface Preparation: After inspection and before shipping, clean steelwork to be painted. Remove loose rust, loose mill scale and spatter, slag or flux deposits. Clean steel in accordance with Steel Structures Painting Council as follows:
 - a. SSPC – SP1 "Solvent Cleaning."
 - b. SSPC – SP2 "Hand Tool Cleaning."
 - c. SSPC – SP3 "Power Tool Cleaning."
 - d. SSPC – SP5 "White Metal Blast Cleaning."
 2. Painting: Immediately after surface preparation apply structural steel primer paint in accordance with manufacturer's instructions and at a rate to provide a minimum uniform dry film thickness of 2.0 mils. Use painting methods which result in full coverage of joints, corners, edges and exposed surfaces.
 3. Refer to the drawings for extent of special preparation.

3.3 MATERIALS PREPARATION:

- A. Mix and prepare paint materials according to manufacturer's written instruction.
- B. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
- C. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
- D. Use only thinners approved by paint manufacturer and only within recommended limits.
- E. Tinting: Tint prime and each undercoat a lighter shade to simplify identification of each coat when multiple coats are applied. Tint prime and undercoats to match the color of the finish coat, but provide sufficient differences in shade to distinguish each separate coat.

3.4 APPLICATION:

- A. Apply materials by brush or roller in accordance with manufacturer's written instructions. Spray application will not be accepted unless specified otherwise herein. **Spray application will not be accepted unless approved by A/E prior to commencing. If spray application is allowed, each application shall be backrolled.** The number of coats and film thickness required are the same regardless of the application method.
- B. Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

- C. Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled and backroll.
- D. Apply first coat to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
- E. Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.
- F. Allow all coats to thoroughly dry before applying succeeding coats.
- G. Sand lightly between each succeeding coat of enamel.
- H. If undercoats, stains or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color and appearance. Give special attention to ensure edges, corners, crevices, welds and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
- I. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, sheen, appearance and coverage. Cloudiness, spotting, holidays, lap, brush marks, runs, sags, ropiness, wrinkles, streaks, shiners, roller stipple, air bubbles, or other surface imperfections will not be acceptable.
- J. Apply stain to wood in a uniform coat and wipe off.
- K. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections. Provide satin finish for final coats.
- L. Prime or seal top and bottom of wood doors same as face and edges of doors.
- M. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convactor covers, covers for finned-tube radiation, grilles, louvers and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.

3.5 EXTERIOR PAINTING:

- A. Paint all surfaces listed under the exterior finish system schedule including but not limited to the following:
 - 1. Items furnished with a factory applied prime coat.
 - 2. Mechanical equipment and supports, ducts, vents and stacks when not indicated as exposed galvanized.
 - 3. Sheet metal flashings not specified as factory prefinished.
 - 4. Metal louvers when not specified as factory prefinished.

5. Hollow metal doors and framing systems.
6. Bollards
7. Handrails and guardrails,
8. Metal coping when not specified as factory prefinished.
9. Overhead doors when not specified as factory prefinished and frames.
10. Metal lintels.

3.6 EXTERIOR FINISH SYSTEM SCHEDULE:

- A. Finish coats of paint required on various surfaces are indicated as 1A + 2B which will require 1 coat of type A material and 2 coats of type B material.

4. Primed Ferrous Metals: 2O
5. Aluminum: 2E
6. Galvanized Metal: 1D + 2O
7. Concrete Masonry Units (Satin): 1EE + 2J
8. Cast-In-Place Concrete (Satin): 2J

3.7 INTERIOR PAINTING:

- A. Paint all rooms listed on "Room Finish Schedule" except as otherwise noted.
- B. Paint all new surfaces and remodeled or patched areas in existing rooms to nearest vertical line break from floor to ceiling each direction with materials to match in color and sheen.
- C. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
- D. Paint galvanized metal ducts, electrical panels, conduit & boxes, pipe hangers and covered pipes in all rooms scheduled to be painted.
- E. Sealed Concrete SC on a finish schedule is not work is covered in this specification.
- F. Paint interior surfaces of ducts where visible through registers or grilles with a flat nonspecular black paint.
- G. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
- H. Paint all prime coated metal, exposed surfaces not factory finished, prime coated mechanical and electrical equipment, uncovered pipe and pipe hangers.
- I. Paint all surfaces listed under the interior finish system schedule.
- J. Refer to "Room Finish Schedule" for location of finishes noted by types on the finish system schedule.
- K. Surfaces not to be painted include the following:

1. Equipment identification, performance rating, name or nomenclature plates.
2. UL, WHI or FM code labels.
3. Concealed spaces including pipe spaces, duct shafts, elevator shafts, utility tunnels, furred areas, concealed areas and generally inaccessible spaces.

3.8 INTERIOR FINISH SYSTEM SCHEDULE:

- A. Finish coats of paint required on various surfaces are indicated as 1A + 2B which will require 1 coat of type A material and 2 coats of type B material.

1. Gypsum Board (Latex Eggshell): 1A + 2L
2. Gypsum Board (Epoxy Semi-Gloss): 1A + 1Q + 1R
3. Concrete Masonry Units (Latex Eggshell): 1B + 2L
4. Concrete Masonry Units (Latex Semi-Gloss): 1B + 2N
5. Concrete Masonry Units (Epoxy Semi-Gloss): 1B + 1Q + 1R
6. Cast-In-Place Concrete (Latex Eggshell): 1A + 1L
7. Galvanized Sheet Metal (Latex Eggshell): 1D + 2L
8. Primed Ferrous Metals (Solvent Satin): 2P
9. Unprimed Ferrous Metal Primer: 1E
10. Metal Joists and Deck: 1X
11. Millwork Interior Wood Boards (Clear): 1U + 1V
12. Floor Coating in Maintenance Building where Indicated: 1Y + 2Z
13. Pipe Covering: 1A + 1L

3.9 CLEANING:

- A. At the end of each workday, remove from the premises all rubbish and accumulated material and leave work in clean condition.
- B. Remove paint that has been misplaced on other surfaces.
- C. Clean, repair and restore all damaged surfaces to their original finish.

END SECTION 09 91 00

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SECTION 10 14 00 - SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes the following types of signs
- B. Specialty signs include the following:
 - 1. Code required room identification.
- C. Related sections:
 - 1. Electrical connections for illuminated signs are specified in Division 26.

1.3 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical data and installation instructions for each type of sign required.
- B. Samples: Submit samples of each color and finish of exposed materials and accessories required for specialty signs. Architect's review of samples will be for color and texture only. When requested, furnish full size samples of specialty sign materials.
- C. Shop Drawings: Submit shop drawings for fabrication and erection of specialty signs. Include plans, elevations and large scale details of sign wording and lettering layout. Show anchorages and accessory items. Furnish location template drawings for items supported or anchored to permanent construction.

PART 2 - PRODUCTS

2.1 IDENTIFICATION SYSTEMS:

- A. Code required room identification: Surface mount signs of type indicated, on wall adjacent to latch side of door at entrances to each room indicating "MEN", "WOMEN" and "ELEVATOR EQUIPMENT".
 - 1. Produce acrylic signs which meet ADA and ANSI A117.1 requirements for raised copy letters and grade 2 braille. Letters are to be 1" Helvetica medium.

Each toilet room sign shall be 8 inch x 8 inch with rounded corners, and have accessibility pictorial.

- a. Men's and Women's toilet rooms.
 - b. Family toilet room.
2. Elevator equipment room identification signage to be identical in style to toilet room signage except overall dimensions of sign shall be proportional to text.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install sign units and components at locations shown or scheduled, securely mounted with concealed theft resistant fasteners, unless otherwise indicated. Attach signs to substrates in accordance with manufacturer's instructions.
- B. Install level, plumb and at proper height. Install square tube posts with one side perpendicular to the traffic direction. Cooperate with other trades for installation of sign units to finish surfaces. Repair or replace damaged units as directed by Architect.

END SECTION 10 14 00

SECTION 10 21 13 - TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes the following toilet compartments:

- 1. Metal, ceiling hung.

- B. Types of urinal screens required include the following:

- 1. Metal, wall hung.

- C. Types of shower stall doors required include the following:

- 1. Metal, wall hung.

- D. Related sections:

- 1. Toilet accessories are specified elsewhere in Division 10.

1.3 QUALITY ASSURANCE:

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to ensure proper fitting of work. However, allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay work.

- B. Coordination: Furnish inserts and anchorages which must be built into other work for installation of toilet partitions and related work; coordinate delivery with other work to avoid delay.

1.4 SUBMITTALS:

- A. Product Data: Submit manufacturer's detailed technical data for materials, fabrication and installation, including catalog cuts of anchors, hardware, fastenings and accessories.

- B. Shop Drawings: Submit shop drawings for fabrication and erection of toilet partition assemblies not fully described by product drawings, templates and instructions for installation of anchorage devices built into other work.

- C. Samples: Submit full range of color samples for each type of toilet partition required. Submit 6 inch square samples of each color and finish on same substrate to be used in work, for color verification after selections have been made.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Provide toilet partitions and screens produced by one of the following:
1. Accurate Partition Div.; USG
 2. Ampco Products, Inc.
 3. Bradley/Mills
 4. Flush-Metal Partition Corp.
 5. General Partitions Manufacturing
 6. Knickerbocker Partition Corporation
 7. Metpar Steel Products Corporation
 8. Santana

2.2 MATERIALS:

- A. General: Provide materials which have been selected for surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material or other imperfections on finished units are not acceptable.
- B. Steel Sheets for Baked Enamel Finish: ASTM A 591, Class C, galvanized-bonderized, of the following minimum thicknesses:
1. Pilasters: 20 gage.
 2. Panels and Screens: 20 gage.
 3. Doors: 22 gage.
- C. Concealed Anchorage Reinforcement: Minimum 12 gage steel sheet.
- D. Concealed Tapping Reinforcement: Minimum 14 gage steel sheet.
- E. Core Material for Metal Partitions: Manufacturer's standard sound deadening, doubled faced honeycomb, of impregnated Kraft paper, in thickness to provide finished dimension of 1 inch minimum for doors, panels and screens, 1-1/4 inch minimum for pilasters.
- F. Pilaster Shoes: ASTM A 167, Type 302/304 stainless steel, not less than 3 inches high and 20 gage, finished to match hardware.
- G. Stirrup Brackets: Manufacturer's standard design for attaching panels to walls and pilasters, as follows:
1. Chromium plated, nonferrous cast alloy, to match hardware finish.
- H. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories, as follows:
1. Chromium plated brass with polished finish.
- I. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, chromium plated steel or brass finished to match hardware, with theft resistant type heads and nuts. For concealed anchors, use hot-dip galvanized, cadmium plated or other rust resistant protective coated steel.

2.3 FABRICATION:

- A. General:
1. Furnish standard doors, panels, screens and pilasters fabricated for partition system and for shower room doors, unless otherwise indicated. Furnish units with cutouts, drilled holes and internal reinforcement to receive partition mounted hardware, accessories and grab bars, as indicated.
 2. Door Dimensions: Unless otherwise indicated, furnish 24 inch wide in-swinging doors for ordinary toilet stalls and 32 inch wide (clear opening) outswinging doors at stalls equipped for use by handicapped. For shower stall doors, refer to the drawings for swings.
- B. Metal Toilet Partitions, Screens and Shower Stall Doors:
1. General: Pressure laminate seamless face sheets to core material and seal edges with continuous interlocking strip or with lapped and formed edges. Weld edges and corners, with exposed welds ground smooth.
 2. Ceiling Hung Partitions: Furnish galvanized steel anchorage devices, complete with threaded rods, lock washers and leveling adjustment nuts at pilasters, to permit connection to structural support above finished ceiling. Furnish devices which are designed to support pilasters from structure without transmitting any load to ceiling finish. Furnish 3 inches high stainless steel trim piece, finished to match hardware, at each pilaster.
 2. Wall Hung Screens and Shower Stall Doors: Furnish panel units in sizes indicated, of same construction and finish as partition system panels.
- I. Hardware: Furnish ADA Compliant hardware for each ADA compartment in partition system, as follows:
1. Standard Hinges: Manufacturer's standard pivot hinges.
 2. ADA Hinges: Cutout inset type, adjustable to hold door open at any angle up to 90 degrees. Provide gravity type, spring-action cam type or concealed torsion rod type, to suit manufacturer's standards.
 3. ADA Latch and Keeper: ADA compliant latch unit, designed for easy emergency access, with combination rubber faced door strike and keeper.
 4. Latch and Keeper: Manufacturer's standard surface mounted latch unit, designed for easy emergency access, with combination rubber faced door strike and keeper.
 5. Coat Hook: Manufacturer's standard unit, combination hook and rubber tipped bumper.
 6. Door Pull: Manufacturer's standard unit.
- J. Accessories: See another Division 10 section.

2.4 FINISHES:

- A. Baked Enamel Finish:
1. Clean galvanized steel surfaces after fabrication and before application of enamel coating system, to remove processing compounds, oils, and other contaminants.
 2. Prime metal with baked-on rust inhibitive primer.
 3. Apply 2 coats of thermosetting enamel finish, applied by electrostatic process and baked in accordance with paint manufacturer's instructions.
 4. Color: One of manufacturer's standard colors in each room, as indicated or, if not indicated, as selected by Architect.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Installer must examine areas and conditions under which toilet partitions and related items are to be installed, including supporting anchors and supports installed by others and must notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION:

- A. General: Comply with manufacturer's recommended procedures and installation sequence. Install partitions rigid, straight, plumb and level. Provide clearances of not more than 1/2 inch between pilasters and panels and not more than 1 inch between panels and walls. Secure panels to walls with not less than two stirrup brackets attached near top and bottom of panel. Locate wall brackets so that holes for wall anchorages occur in masonry or tile joints. Secure panels to pilasters with not less than two stirrup brackets located to align with stirrup brackets at wall. Secure panels in position with manufacturer's recommended anchoring devices.
- B. Ceiling Hung Partitions: Secure pilasters to supporting structure and level, plumb and tighten installation with devices furnished. Hang doors and adjust so that bottoms of doors are level with bottom of pilasters when doors are in closed position.
- C. Wall Hung Screens and Shower Stall Doors: Attach with heavy-duty concealed anchoring devices, as recommended by manufacturer to suit supporting wall structure. Set units to provide support and to resist lateral impact.

3.3 ADJUST AND CLEAN:

- A. Hardware Adjustment: Adjust and lubricate hardware for proper operation. Set hinges on in-swinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on outswinging doors (and entrance swing doors) to return to fully closed position.
- B. Clean exposed surfaces of partition systems using materials and methods recommended by manufacturer and provide protection as necessary to prevent damage during remainder of construction period.

END SECTION 10 21 13

SECTION 10 21 23 - CUBICLE CURTAINS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes the following:
 - 1. Cubicle Curtain and Support at Wash Bay.

1.3 SUBMITTALS:

- A. Product Data including durability, fade resistance, and fire-test-response characteristics for each type of curtain fabric specified.
- B. Shop Drawings showing layout and types of cubicles, size of curtains, number of grommets, anchorage details, and conditions requiring accessories. Indicate dimensions taken from the drawings and verified by field measurements.
- C. Samples for initial color selection in the form of manufacturer's color charts for each type of curtain fabric indicated.
- D. Samples for verification of the following products, showing the full range of color and texture variations expected.
 - 1. Curtain material: 12-inch square swatch from vinyl stock used for the Work, with specified treatments applied. Show complete pattern repeat, if any. Provide sample with top edge and hole reinforcement.
 - a. Provide swatch for main curtain.
 - b. Provide swatch for clear vision panel.

1.4 PROJECT CONDITIONS:

- A. Field Measurements Verify dimensions by field measurements. Verify that cable and curtains may be installed to comply with the original design.
- B. Space Enclosure and Environmental Limitations Do not install tracks and curtains until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, and work above ceilings is complete.

1.5 WARRANTY:

- A. Manufacturer's standard 5 year warranty on curtain. Lifetime warranty on all hardware. Submit two copies of warranty documents for inclusion in the Operation and Maintenance manuals as specified in Division 1.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

- A. Manufacturers: Subject to compliance with requirements, provide cubicles by the following manufacturer or equal:

Goff's Enterprises, Inc.
1228 Hickory Street
Pewaukee, Wisconsin 53072

- B. Product: Wash Bay Curtains.

2.2 CUBICLE CURTAIN SUSPENSION AND HARDWARE:

- A. Suspension System: Manufacturer's standard component system to accommodate hanging by suspension cable as indicated, and other accessories as required for secure and operational installation.
- B. Cable and end terminations: Sized by manufacturer based on superimposed load of the curtain.
 - 1. Cable Material: Stainless steel, Type 304.
- C. Fasteners: S-hooks or similar hardware furnished by manufacturer and sized appropriately for the installation.
 - 2. Hook material: Stainless steel, Type 304.
- D. Cable Mounting: Mounting as indicated.
 - 1. Exposed fastener materials: Stainless steel

2.3 CUBICLE CURTAINS:

- A. Fabric: Provide cubicle curtain materials with the following characteristics:
 - 1. PVC: Flameproof curtains shall be PVC material and shall be inherently and permanently flame resistant for the life of the material.
 - 2. Provide solid color material for lower and upper panels.
 - 3. Provide clear see-through material for center vision panel.
 - 4. Colors shall be as selected by Architect from manufacturer's standard colors available.
- B. Provide curtains fabricated to comply with the following requirements:
 - 1. Manufacturer's standard mounting grommets.
 - 2. Basic curtain construction: 14-18 oz. vinyl reinforced with polyester.

3. 20 mil. clear PVC window section. Indicate window section location dimensions in the shop drawings.
4. Lock stitched vertical seams for optimum strength & durability.
5. Fully enclosed chain weighted lower hems.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install cubicle curtain cable level and taught, according to manufacturer's written instructions and original design.
- B. Install curtain panels on cable.
- C. Install per details on drawings.
- D. Clean curtain, removing any dust and soil which may have accumulated during installation. Leave ready for use.
- E. Clean curtain, removing any dust and soil which may have accumulated during installation. Leave assembly ready for use.

END SECTION 10 2123

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SECTION 10 26 00 - WALL PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes the following:
 - 1. Corner Guards
- B. Related Sections:
 - 1. Division 6 Section - "Rough Carpentry" for wood blocking for surface mounted units.

1.3 SUBMITTALS:

- A. Product Data: Provide manufacturer's specifications including physical characteristics such as durability, resistance to fading, flame resistance and impact resistance for each wall protection system component indicated. Include installation instructions for each type unit.
- B. Shop Drawings: Show locations, extent and installation details of each wall protection system component. Show methods of attachment to adjoining construction.
- C. Samples: Submit full size section samples of units to Architect for review of design.

1.4 QUALITY ASSURANCE:

- A. Manufacturer: Provide each type of unit as manufactured by a single manufacturer.

Inpro, IPC
Pro-tek; Pawling Rubber Corp.
Tri-Guard, Inc.

PART 2 - PRODUCTS

2.1 MATERIALS:

- A. Provide rigid polyvinyl chloride corner guards with the following characteristics:

1. Fire Performance Characteristics: Provide UL Classified corner guards conforming with NFPA Class A fire rating.
2. Surface Burning Characteristics, determined by UL-723 (ASTM E-84) as follows:
 - a. Flame Spread: 10.
 - b. Smoke Developed: 350-450.
3. Extruded rigid plastic: Textured, chemical- and stain- resistant, high impact resistant, PVC or acrylic modified vinyl plastic with a minimum impact resistance of 25.4 ft-lbf/in of width when tested according to ASTM D 256, Test Method A.
4. Snap-on type with surface mounted aluminum retainer.
5. Fire Resistance: ASTM D 635, UL Flammability Rating VI, self-extinguishing.
6. Length: as shown on drawings.
7. Configuration: 90 degree corner with 1/8 inch radius.
8. Width: Nominal 1 1/2 inches.
9. Thickness: 1/8 inch.
10. Height: 96 inches.
11. Profile: Radiused for flush surface mounting on wall.
12. Color and Texture: As selected by Architect from manufacturers full range of standard colors available.
13. Aluminum Extrusions: Provide alloy and temper recommended by manufacturer for the use and finish indicated, but not less than the strength and durability properties specified in ASTM B 221 for alloy 6063-T5.
14. Fasteners: manufacturer's standard.
15. Acceptable Manufacturers:
 - a. Acrovyn Products
 - b. InPro Corporation, Model #150BN
 - c. Korogard Wall Protection System, Model #G200
 - d. Pawling Corp., Model #CG-10/TC-10
 - e. Architect pre-approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install units in accordance with manufacturer's instructions, using fasteners which are appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored in locations indicated.
- B. Install polyvinyl chloride corner guards with surface mounted aluminum retainers.

3.2 ADJUST AND CLEAN:

- A. Clean and polish all exposed surfaces after removing protective coatings.

END SECTION 10 26 00

SECTION 10 28 00 - TOILET ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 SUMMARY:

- A. This section includes the following:

- 1. Toilet Accessories:

- a. Waste receptacles (WR).
 - b. Paper Towel Dispenser (PTD) **O.F.O.I.**
 - c. Framed mirror units (MIR).
 - d. Sanitary napkin dispenser (SND) **O.F.O.I.**
 - e. Sanitary napkin receptacle (SNR).
 - f. Toilet paper dispensers (TPD) **O.F.O.I.**
 - g. Grab bars (GB).
 - h. Shower curtain rods, shower curtains and hooks (C/CR)
 - i. Soap dispensers. (SD) **O.F.O.I.**
 - j. Shower basket. (SB)
 - k. Folding shower seat. (SS-1)
 - l. Fixed shower stall seat (SS-2)
 - m. Robe hook. (RH)
 - n. Mop and broom holder. (MH)

- 2. Infant Care Products:

- a. Diaper Changing Station. (DC)

- B. Related sections:

- 1. Division 10 Section "Toilet Compartments" for toilet partitions and screens.

1.3 QUALITY ASSURANCE:

- A. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.
- B. Accessory Locations: Coordinate accessory locations with other work to prevent interference with clearances required for access by disabled persons, proper installation, adjustment, operation, cleaning, and servicing of accessories.

- C. Products: Provide products of same manufacturer for each type of accessory unit and for units exposed in same areas, unless otherwise acceptable to Architect.

1.4 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical data and installation instructions for each toilet accessory.
- B. Samples: Submit full size samples of units to Architect for review of design and operation. Acceptable samples will be returned and may be used in the work.
- C. Setting Drawings: Provide setting drawings, templates, substrate preparation, instructions and directions for installation of anchorage devices in other work.

PART 2 - PRODUCTS

2.1 MANUFACTURER:

- A. Provide each type of toilet accessory required as manufactured by one of the following:
 - 1. A&J Washroom Accessories, Inc.
 - 2. American Specialties, Inc.
 - 3. Bobrick Washroom Equipment, Inc.
 - 4. Bradley Corporation
 - 5. General Accessories Manufacturing Co.
 - 6. Mckinney / Parker Washroom Accessories
- B. Provide each type of Infant-Care Product required as manufactured by one of the following:
 - 1. American Infant Care Products, Inc.
 - 2. American Specialties, Inc.
 - 3. Brocar Products, Inc.
 - 4. General Accessory manufacturing Co.
 - 5. Koala Corporation.
 - 6. Safe-Strap Company, Inc.

2.2 MATERIALS:

- A. Stainless Steel: ASTM Type A66, 304, with No. 4 finish (satin), 0.0312 inch minimum nominal thickness, unless otherwise indicated.
- B. Brass: ASTM B 19, leaded and unleaded flat products, ASTM B 16, rods, shapes, forgings and flat products with finished edges; ASTM B 30, castings.
- C. Sheet Steel: ASTM A366 Cold rolled, commercial quality ASTM A 366, 0.039 inch minimum nominal thickness, unless otherwise indicated. Surface preparation and metal pretreatment as required for applied finish.

- D. Galvanized Steel Sheet: ASTM A 653, G60.
- E. Chromium Plating: ASTM B 456, Service Condition Number SC 2 (moderate service), nickel plus chromium electrodeposited on base metal.
- F. Baked Enamel Finish: Factory applied, gloss white, baked acrylic enamel coating.
- G. Mirror Glass: ASTM C 1036, Type I, Class I, Quality q2, 1/4 inch thick, with silvering, electroplated copper coating, and protective organic coating complying with FS DD-M-411.
- H. Galvanized Steel Mounting Devices: ASTM A 153, hot-dip galvanized after fabrication.
- I. Fasteners: Screws, bolts and other devices of same material as accessory unit , tamper and theft resistant when exposed, and of galvanized steel when concealed.

2.3 FABRICATION:

- A. General: Stamped names or labels on exposed faces of toilet accessory units are not permitted, except where otherwise indicated. On interior surface not exposed to view or on back surface of each accessory, provide printed, waterproof label or stamped nameplate indicated manufacturer's name and product model number.
- B. Locking: Wherever locks are required for a particular type of toilet accessory, provide same keying throughout project. Furnish two keys for each lock.
- C. Surface Mounted Toilet Accessories: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous piano hinge or minimum of two 1-1/2 inch pin hinges of same metal as unit cabinet. Provide concealed anchorage wherever possible.
- D. Recessed Toilet Accessories: Except where otherwise indicated, fabricate units of all welded construction, without mitered corners. Hang doors or access panels with full length stainless steel piano hinge. Provide anchorage which is fully concealed when units is closed.
- E. Waste Receptacles (WR):
 - 1. Open Recessed Stainless Steel Type: Fabricate with seamless exposed flange, removable receptacle with seamless exposed walls, hemmed edges, secured by tumbler lockset. Furnish heavy-duty vinyl removable liner, secured to receptacle at not less than 4 points by means of grommets, stainless steel hooks; nominal 20.0 gallon capacity.
- F. Paper Towel Dispenser (PTD): **O.F.O.I.**
- G. Framed Mirror units (MIR):
 - 1. Standard Stainless Steel Framed Mirror Units: Fabricate frame with channel shapes not less than 0.0375 inch, with square corners carefully mitered to hairline

joints and mechanically interlocked. Provide glass edge protection material within frame and mirror backing and support system that permits rigid, tamper-resistant glass installation and prevents moisture accumulation.

- a. Provide galvanized steel backing sheet, not less than 0.034 inch and full mirror size, with nonabsorptive filler material. Corrugated cardboard is not an acceptable filler material.
- b. Provide mirror-unit mounting system of one-piece, galvanized steel, with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.

H. Sanitary Napkin Dispensers (SND) **O.F.O.I.**

I. Sanitary Napkin Receptacle (SNR):

1. Surface Mounted Stainless Steel Type: Fabricate with seamless exposed walls, tightly self-closing top cover embossed with "Napkin Disposal." Provide locking bottom panel with continuous stainless steel piano hinge.

J. Toilet Paper Dispensers (TPD) **O.F.O.I.**

K. Grab Bars (GB):

1. Stainless Steel Type: Provide grab bars with wall thickness not less than 18 gage and as follows:
 - a. Mounting: Concealed, manufacturer's standard flanges and anchorages.
 - b. Gripping Surfaces: Smooth, polished finish.
 - c. Heavy-Duty Size: 1-1/2 inch outside diameter, with wall thickness not less than 16 gage.

L. Shower curtain rods, shower curtains and hooks. (C/CR):

1. Stainless Steel Shower Curtain Rod: Provide shower curtain rods as follows:
 - a. Tubing: 18 gauge stainless steel, seamless construction with exposed surfaces in architectural satin finish.
 - b. Diameter: 1-1/4" diameter.
 - c. Escutcheons: 22 gauge stainless steel. One-piece drawn construction with exposed surfaces in architectural satin finish. Snap over flanges to conceal mounting screws.
 - d. Flanges: Glass polypropylene, 3/8" dia. Shower rod support sleeves formed with flange as one piece.
2. Stainless Steel Shower Curtain Hooks: Provide shower curtain hooks as follows:
 - a. Tubing: 18 gauge stainless steel, seamless construction with exposed surfaces in architectural satin finish.
 - b. Stainless steel spring wire with snap fastener. Can be used with 1-1/4" diameter curtain rods.

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3. Shower Curtain: Provide shower curtain as follows:
 - a. Antibacterial Shower Curtain: Minimum 10-oz., nylon-reinforced vinyl or 0.008 inch thick vinyl material with integral antibacterial agent and corrosion-resistant grommets at minimum 6 inches on center through top hem.

M. Soap Dispensers (SD):

1. Liquid Soap, Horizontal Tank Type: Fabricate for surface mounting, sized for 40 fluid ounce minimum capacity. Provide stainless steel piston, springs and internal parts designed to dispense liquid soap or lather in measured quantity by pump action. Provide cover in stainless steel, with unbreakable window-type refill indicator.

N. Shower basket (SB):

1. Construction: Fabricate of polished stainless steel for surface mounting in corner.
2. Nominal radius: 6 inches x 3 inches deep.
3. Basis-of-Specification manufacturer and product: Kohler #1896
4. Provide specified of architect pre-approved equal.

O. Folding Shower Seat (SS-1):

1. Provide heavy-duty hinged seat designed to fold up against wall when not in use with stainless-steel support braces, hinges, frame, and fasteners; of all-welded construction;
2. Configuration: Rectangular-shaped seat, designed for wheelchair access.
3. Seat material: Phenolic or polymeric composite of slat-type construction. Color as selected by Architect from manufacturer's full range.

P. Fixed Shower Stall Seat (SS-2):

1. Fabricate shower stall seat from stock extruded or solid stock aluminum components:
 - a. 12" wide extruded aluminum seat planks by length as indicated on the drawings.
 - b. Provide and secure end caps or castings to terminate cut ends of bench.
 - c. Welded supports, no less than two per seat with a capacity of 250 pounds per each.
 - d. Provide concealed attachment hardware which will leave the seat free of artifacts which will catch clothing or cause discomfort in use.
2. Manufacturer offering acceptable seat components and custom fabrication is as follows:
 - a. Aluminum Seating, Inc., P.O. Box 3310 San Bernardino, CA 92413
U.S.A.; (800)757-7328; sales@aluminumseating.com

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3. Subject to compliance with requirements, provide products by listed supplier or Architect pre-approved equal.
- Q. Robe Hook (RH):
1. Double-prong Unit: Stainless-steel, double-prong robe hook with rectangular wall bracket and backplate for concealed mounting. Overall projection shall not exceed 4 inches from face of wall.
- R. Mop and Broom Holder (MH):
1. Mop and Broom Holder: 36-inch-long unit fabricated of minimum nominal 0.0375-inch-thick, stainless-steel hat channel with four spring-loaded, rubber, cam-type, mop/broom holders.
- S. Diaper Changing Station:
1. Horizontal, Surface-Mounted Unit: Diaper-changing station with surface-mounted, mildew-resistant, molded polyethylene body that folds horizontally against wall when not in use; projects not more than 4 inches from wall when closed; and is engineered to support a minimum of 250 pound static weight when opened. Provide unit with lid hinge shock-absorbing operating mechanism and built-in dispenser for sanitary liners.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. Installer must examine substrates, previously installed inserts and anchorages necessary for mounting of accessories and other conditions under which installation is to occur and must notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION:

- A. Install accessory units in accordance with manufacturer's instructions, using fasteners which are appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored in locations indicated.
- B. Secure mirrors to walls in concealed, tamper-resistant manner with special hangers, toggle bolts, or screws. Set units level, plumb, and square at locations indicated, according to manufacturer's written instructions for substrate indicated.
- C. Shower Stall Seats: Secure to wall in a manner which will support a minimum load on each support of 250 pounds. Install with corrosion resistant fasteners.
- D. Install grab bars to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.

3.3 ADJUST AND CLEAN:

- A. Adjust accessories for proper operation and verify that mechanisms function smoothly.
- B. Clean and polish all exposed surfaces after removing protective coatings and temporary labels.

END SECTION 10 28 00

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SECTION 10 44 00 - FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes the following:

- 1. Fire Extinguishers.
- 2. Fire Extinguisher Cabinets
- 3. Fire Extinguisher Mounting Brackets

- B. Related sections:

- 1. Fixed fire protection systems are specified in Division 21 sections.

1.3 QUALITY ASSURANCE:

- A. Provide portable fire extinguishers and accessories by one manufacturer, unless otherwise acceptable to Architect.
- B. Portable Fire Extinguisher Standard: Provide new portable fire extinguishers which comply with applicable UL standard and are labeled by UL.

1.4 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical data and installation instructions for all portable fire extinguishers required. Where color selections by Architect is required include color charts showing full range of manufacturer's standard colors and designs available.
- B. Samples: Submit 3 samples, 6 inches square, of each required finish. Prepare samples of metal of same gage as metal to be used in the work. Where normal color variations are to be expected, include 2 or more units in each sample showing the limits of such variations.

PART 2 - PRODUCTS

2.1 MANUFACTURER:

- A. Provide products by one of the following:

1. American Specialties, Inc.
2. J. L. Industries
3. Larsen's Manufacturing Company
4. Modern Metal Products
5. Lyon Metal Products

2.2 FIRE EXTINGUISHERS:

- A. General: Provide fire extinguishers for each extinguisher cabinet and other locations indicated, in colors and finishes selected by Architect from manufacturer's standard which comply with requirements of governing authorities.
 1. Fill and service extinguishers to comply with requirements of governing authorities and manufacturer's requirement.
 2. Abbreviations indicated below to identify extinguisher types relate to UL classification and ratings system and not, necessarily, to type and mount of extinguishing material contained in extinguisher.
- B. MultiPurpose Dry Chemical Type (4A-60BC-FE): UL rated 4-A:60-B:C, 10 lb. nominal capacity, in enameled steel container, for Class A, Class B and Class C fires.

2.3 MOUNTING BRACKETS:

- A. Provide manufacturer's standard bracket designed to prevent accidental dislodgement of extinguisher, of proper size for type and capacity of extinguisher indicated, in manufacturer's standard plated finish.
 1. Provide brackets for extinguishers not located in cabinets.

2.4 FIRE EXTINGUISHER CABINETS:

- A. General: Provide fire extinguisher cabinets where indicated of suitable size for housing fire extinguishers of types and capacities indicated.
- B. Construction: Manufacturer's standard enameled steel box, with trim, frame, door and hardware to suit cabinet type, trim style and door style indicated. Weld all joints and grind smooth. Miter and weld perimeter doorframes.
- C. Cabinet Type: Suitable for mounting conditions indicated, of the following types:
 1. Semirecessed: Cabinet box (tub) partially recessed in walls of shallow depth.
- D. Trim Style: Fabricate trim in one piece with corners mitered, welded and ground smooth.
 1. Exposed Trim: One piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
 - a. Rolled-Edge Trim: Rounded edges with backbend depth as follows:

- 1) Trim Width: 2-1/2 inches
 - a. Trim Metal: of same metal as door.
- E. Door Material and Construction: Manufacturer's standard door construction, of material indicated, coordinated with cabinet types and trim styles selected.
 1. Enameled Steel: Manufacturer's standard flush, hollow steel door construction with tubular stiles and rails.
- F. Door Style: Manufacturer's standard design as indicated below and on drawing.
 1. Full Glass Panel: DSA glass unless otherwise indicated.
- G. Door Hardware: Provide manufacturer's standard door operating hardware of proper type for cabinet type, trim style and door material and style indicated. Provide either lever handle with cam action latch or door pull, exposed or concealed and friction latch. Provide concealed or continuous type hinge permitting door to open 180 degrees.

2.5 FACTORY FINISHING OF FIRE EXTINGUISHER CABINETS:

- A. General: Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations except as otherwise indicated. Apply finishes in factory after products are assembled. Protect cabinets with plastic or paper covering, prior to shipment.
- B. Painted Finishes:
 1. Preparation: Clean surfaces of dirt, grease and loose rust or mill scale. Apply finish to all surfaces of fabricated and assembled units, whether exposed or concealed when installed, except those surfaces specified to receive another finish.
 2. Baked Enamel Finish: Immediately after cleaning and pretreatment, if any, apply manufacturer's standard baked enamel coating.
 - a. Provide manufacturer's standard colors. Refer to the drawings for color at specific locations.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Install items included in this section in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of governing authorities.
- B. Prepare recesses in walls for fire extinguisher cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.
- C. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb, to comply with manufacturer's instructions.

- D. Where exact location of bracket mounted fire extinguishers is not indicated, locate as directed by Architect.

3.2 IDENTIFICATION:

- A. Identify fire extinguisher in cabinet with red lettering spelling "FIRE EXTINGUISHER" painted on door by silk screen process. Provide lettering on door as indicated, or if not indicated, as selected by Architect from manufacturer's standard letter sizes, styles, colors and layouts.
- B. Identify bracket mounted extinguishers with red letter decals spelling "FIRE EXTINGUISHER" applied to wall surface. Letter size, style and location as selected by Architect.

END SECTION 10 44 00

SECTION 12 24 00 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes room darkening roller shades.
- B. Related Sections include the following:
 - 1. Division 06 Section "Miscellaneous Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.
- B. Shop Drawings: Show location and extent of roller shades. Include elevations, sections, details, and dimensions not shown in Product Data. Show installation details, mountings, attachments to other work, operational clearances, and relationship to adjoining work.
- C. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
 - 1. Shade mounting assembly and attachment.
 - 2. Size and location of access to shade operator, and adjustable components.
- D. Samples for Verification:
 - 1. Complete, full-size operating unit not less than 16 inches wide for each type of roller shade indicated. Approved sample may become part of the completed Work if undisturbed at time of Substantial Completion.
 - 2. For the following products:
 - a. Shade Material: Not less than 12-inch- square section of fabric, from dye lot used for the Work, with specified treatments applied. Show complete pattern repeat. Mark top and face of material.

- E. Window Treatment Schedule: For roller shades. Use same designations indicated on Drawings.
- F. Product Certificates: For each type of roller shade, signed by product manufacturer.
- G. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for each type of roller shade.
- H. Maintenance Data: For roller shades to include in maintenance manuals. Include the following:
 - 1. Methods for maintaining roller shades and finishes.
 - 2. Precautions about cleaning materials and methods that could be detrimental to fabrics, finishes, and performance.
 - 3. Operating hardware.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed installation of roller shades similar in material, design and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. Source Limitations: Obtain roller shades through one source from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide roller shade band materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
 - 1. Flame-Resistance Ratings: Passes NFPA 701.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- E. Product Standard: Provide roller shades complying with WCMA A 100.1.
- F. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Build mock-ups in the location and size indicated or, if not indicated, as directed by the Architect.
 - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in factory packages, marked with manufacturer and product name, and location of installation using same designations indicated on Drawings and in a window treatment schedule.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install roller shades until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
- B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 ROLLER SHADES

- A. Available Manufacturers: Subject to compliance with requirements, Manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Products: Subject to compliance with requirements, provide one of the following:
 - 1. Lutron Shading Solutions by VIMCO.
 - 2. MechoShade Systems, Inc.
 - 3. Springs Window Fashions.
 - 4. Verosol USA, Inc.; OEM Shades Inc.
- C. Shade Band Material: PVC-coated polyester.
 - 1. Fabric Width: As required to suit opening widths.
 - 2. Pattern: Refer to "Schedule Of Interior Finishes."
 - 3. Style: Refer to "Schedule Of Interior Finishes."
 - 4. Colors: As selected by Architect from manufacturer's full range.
 - 5. Material Openness Factor: Refer to "Schedule Of Interior Finishes."
 - 6. Bottom Hem: Straight.
 - 7. Trim: As indicated by manufacturer's designation for style and color.
- D. Rollers: Electrogalvanized or epoxy primed steel or extruded-aluminum tube of diameter and wall thickness required to support and fit internal components of operating system and the weight and width of shade band material without sagging; designed to be easily removable from support brackets; with removable spline fitting integral channel in tube for attaching shade material. Provide capacity for one roller shade band(s) per roller, unless otherwise indicated.
- E. Lifting Mechanism: Manufacturer's standard beaded roller chain with clutch.
- F. Direction of Roll: Regular, from back of roller.
- G. Mounting Brackets: Galvanized or zinc-plated steel.

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- H. Bottom Bar: Steel or extruded aluminum, with plastic or metal capped ends. Provide exposed-to-view, external-type bottom bar with concealed weight bar as required for smooth, properly balanced shade operation.
- I. Mounting: Surface mounting permitting easy removal and replacement without damaging roller shade or adjacent surfaces and finishes. Provide manufacturer's standard removable aluminum headbox with endcaps to conceal mounting brackets where necessary. Size headbox to minimum available to accommodate shadecroll and brackets. Headbox finish to be selected from manufacturer's standard offerings.

2.2 ROLLER SHADE FABRICATION

- A. Product Description: Roller shade consisting of a roller, a means of supporting the roller, a flexible sheet or band of material carried by the roller, a means of attaching the material to the roller, a bottom bar, and an operating mechanism that lifts and lowers the shade.
- B. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.
 - 1. Lifting Mechanism: With permanently lubricated moving parts.
- C. Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F:
 - 1. Shade Units Installed between (Inside) Jambs: Edge of shade not more than 1/4 inch from face of jamb. Length equal to head to sill dimension of opening in which each shade is installed.
- D. Installation Brackets: Designed for easy removal and reinstallation of shade, for supporting roller, and operating hardware and for hardware position and shade mounting method indicated.
- E. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to shade hardware and adjoining construction; type designed for securing to supporting substrate; and supporting shades and accessories under conditions of normal use.
- F. Color-Coated Finish: For metal components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.
- G. Colors of Metal and Plastic Components Exposed to View: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, accurate locations of connections to building electrical system, and other conditions affecting performance.

- 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

- A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions, and located so shade band is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.

3.3 ADJUSTING

- A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

- A. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
- C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain roller shades.

END OF SECTION 12 24 00

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SECTION 12 48 00 - ENTRANCE FLOOR MATS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Applicable provisions of Division 1 shall govern work under this Section.

1.2 DESCRIPTION OF WORK:

- A. This section includes the following types of floor mats.
 - 1. Surface type.

1.3 QUALITY ASSURANCE:

- A. Furnish entrance mats and accessories by one manufacturer for the entire project.
- B. In addition to the requirements of these specifications, comply with manufacturer's instructions and recommendations for preparation of substrate, installation of frames and anchors and application of entrance mats.
- C. Provide colors of materials for entrance mats as shown on the drawings or, if not shown, as selected by the Architect from manufacturer's standard colors and patterns.
- D. Defer setting entrance frames until after concrete slabs are placed and until frame locations can be precisely coordinated with adjoining related work. Provide recess in concrete slab of adequate depth and size to allow for vertical and horizontal adjustment and for grouting-in of frame and anchorages and application of delayed concrete floor topping to support mat.
- E. Field Measurements: Take field measurements prior to preparation of shop drawing (if any) and fabrication, where possible, to ensure proper fitting of the work. However, do not delay job progress; allow for trimming and fitting wherever the taking of field measurements before fabrication might delay the work.
- F. Shop Assembly: Preassemble mat frames and mats in shop to ensure proper fit of mat to frame and of frame joinery. Disassemble frame to the extent necessary for shipping and job handling limitations. Clearly mark units for reassembly and coordinated installation.

1.4 SUBMITTALS:

- A. Product Data: Submit manufacturer's specifications and installation instructions for each type of entrance mat. Include methods of installation for each type of substrate to receive frames.

- B. Samples: Submit samples for each type and color of entrance mat, frames and accessories required. Provide 12 inch square samples of mat materials and 12 inch lengths of frame members.
- C. Shop Drawings: Submit shop drawings for entrance mats. Include full scale section of typical installations. Show details of patterns or designs, anchors and accessories.

1.5 JOB CONDITIONS:

- A. Coordinate recessed mat frame installation with concrete work specified in Division 3 to ensure that mat frame or recess for frame, if to be installed after concrete placement, is at proper elevation and location indicated or required to fit properly to adjoining related work and that anchorage devices for frame are or can be securely embedded. Furnish setting drawings, templates and instructions for installation of frame and anchorage devices. Coordinate delivery with other work to avoid delay.
- B. Protect mat frame from damage of any kind during construction period by providing temporary cover of suitable material.

PART 2 - PRODUCTS

2.1. MANUFACTURER:

- A. Provide products by one of the following:
 - 1. American Floor Products, Co., Rockville, MD
 - 2. Cactus Mat Manufacturing Co., El Monte, CA
 - 3. Durable Mat Co., Norwalk, OH
 - 4. R.C. Musson Rubber Co., Akron, OH
 - 5. Reese USA, Rosemount, MN
 - 6. Pawling Rubber Co., Pawling, NY
 - 7. U.S. Mat & Rubber Co., Inc., Brockton, MA

2.2. MATERIALS:

- A. Mat Frames: Manufacturer's standard design of size and style to suit the mat type and adjacent finish floor or wall construction, for permanent recessed installation in concrete subfloor. Furnish complete with corner pins or reinforcing, and installation anchorages.
 - 1. Provide frames of extruded 6063-T5 alloy aluminum. Coat surface of frame which will contact concrete with zinc chromate paint or manufacturer's standard protective coating.
 - 2. Provide frame members in single lengths or where sides exceed maximum available lengths in minimum number of pieces possible, with joints equally spaced and spliced together by means of straight connecting pins.
- B. Link Type Mats: Manufacturer's standard, minimum 3/8 inch thick, of following design, material and construction, with approximately 2 inches wide, square-edged nosing vulcanized and steel reinforced ends.

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1. Design: "Heelproof," with solid weave (no openings) made up of squares or continuous strips.
2. Mat slat material: 6063-T5 alloy aluminum.
3. Mat hinge material: Manufacturer's standard rubber type.
4. Walk-off surface material: 100% nylon pile.
 - a. Color to be selected by Architect from manufacturer's standard offerings.
5. Frame Style: Sloped transition fabricated of extruded aluminum for surface mounting.

2.3. FABRICATION:

- A. Fabricate mat frames to sizes indicated, verified by field measurement and coordinated with related, adjoining work. Miter frame corners to produce tight fitting hairline joints.
- B. Fabricate mats in one piece, unless indicated otherwise, to closely fit mat frames; or where mat areas exceed maximum sizes manufactured, in equal sized section of sizes indicated, or if not indicated, as recommended by manufacturer for ease of handling.

PART 3 - EXECUTION

3.1 INSTALLATION:

- A. Provide widest material possible and layout to minimize number of seams.
- B. Install surface mounted frames and entrance mat to comply with manufacturer's instructions, at locations indicated and with top of frames and mats in proper relationship to one another and to adjoining finished flooring. Set mat tops at proper height for most effective cleaning action; coordinate top of mat surface with doors that swing across mats to provide adequate underdoor clearance.
- C. Provide necessary shims, spacers and anchorages for proper location and secure attachment.

END SECTION 12 48 00

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SECTION 13 34 19 - METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes metal building systems that consist of integrated sets of mutually dependent components including structural framing, roof panels, wall panels, doors and frames, and accessories.
- B. Related Sections include the following:
 - 1. Division 3 Section "Cast-in-Place Concrete" for concrete foundations, slabs, and anchor-bolt installation.
 - 2. Division 5 Section "Structural Metal Framing"
 - 3. Division 8 Section for coordination of hardware not included in this scope.
 - 4. Division 8 Section "Hollow metal Doors and Frames."
 - 5. Division 8 Section "Overhead Coiling Doors."
 - 6. Division 8 Section "Sectional Overhead Doors."
- C. Coordinate the purchase of wall panel material by Division 07 42 00 – Metal Wall Panels from the PEMB manufacturer so that a sufficient quantity of identical material is produced for the entire project at one time.” (The intent is that Wall Panel 2 provided for the pre-function building by Section 07 42 00 is obtained from the same source as the PEMB wall panels.)

1.3 DEFINITIONS

- A. Bay: Dimension between main frames measured normal to frame (at centerline of frame) for interior bays, and dimension from centerline of first interior main frame measured normal to end wall (outside face of end-wall girt) for end bays.
- B. Building Length: Dimension of the building measured perpendicular to main framing from end wall to end wall (outside face of girt to outside face of girt).
- C. Building Width: Dimension of the building measured parallel to main framing from sidewall to sidewall (outside face of girt to outside face of girt).
- D. Clear Span: Distance between supports of beams, girders, or trusses (measured from lowest level of connecting area of a column and a rafter frame or knee).

- E. Eave Height: Vertical dimension from finished floor to eave (the line along the sidewall formed by intersection of the planes of the roof and wall).

1.4 SYSTEM DESCRIPTION

- A. General: Provide a complete, integrated set of manufacturer's mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior. Include primary and secondary framing, roof and wall panels, insulation, and accessories complying with requirements indicated.
 - 1. Provide metal building system of size and with spacings, slopes, and spans indicated on Drawings.

1.5 SYSTEM PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal building systems capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Engineer metal building systems according to procedures in MBMA's "Metal Building Systems Manual."
 - 2. Design Loads: As indicated on Drawings.
 - 3. Collateral Loads: Include additional dead loads other than the weight of metal building system for permanent items such as sprinklers, mechanical systems, electrical systems, and ceilings.
 - 4. Load Combinations: Design metal building systems to withstand the most critical effects of load factors and load combinations as required by applicable codes.
 - 5. Deflection Limits: Engineer assemblies to withstand design loads with deflections no greater than the following:
 - a. Purlins and Rafters: Vertical deflection of 1/180 the span.
 - b. Girts: Horizontal deflection of 1/180 of the span.
 - c. Metal Roof Panels: Vertical deflection of 1/180 of the span.
 - d. Metal Wall Panels: Horizontal deflection of 1/180 of the span.
 - 6. Design secondary framing system to accommodate deflection of primary building structure and construction tolerances, and to maintain clearances at openings.
 - 7. Provide metal panel assemblies capable of withstanding the effects of loads and stresses indicated, based on testing according to ASTM E 1592.
 - 8. Lateral deflection: design primary structure for a maximum horizontal deflection of height/90, and design primary structure for a maximum of 1 inch of horizontal movement at the top of the concrete walls.

- B. Seismic Performance: Design and engineer metal building systems capable of withstanding the effects of earthquake motions determined according to applicable codes.
- C. Thermal Movements: Provide metal panel systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
- D. Thermal Performance: Provide insulated metal panel assemblies with the following maximum U-factors and minimum R-values for opaque elements when tested according to ASTM C 1363 or ASTM C 518 as indicated on Drawings.
- E. Air Infiltration for Metal Roof Panels: Air leakage through assembly of not more than 0.06 cfm/sq. ft. of roof area when tested according to ASTM E 1680 at negative test-pressure difference of 1.57 lbf/sq. ft.
- F. Air Infiltration for Metal Wall Panels: Air leakage through assembly of not more than 0.06 cfm/sq. ft. of wall area when tested according to ASTM E 283 at static-air-pressure difference of [6.24 lbf/sq. ft.
- G. Water Penetration for Metal Roof Panels: No water penetration when tested according to ASTM E 1646 at test-pressure difference of 2.86 lbf/sq. ft.
- H. Water Penetration for Metal Wall Panels: No water penetration when tested according to ASTM E 331 at a minimum differential pressure of 20percent of inward-acting, wind-load design pressure of not less than 6.24 lbf/sq. ft. and not more than 12 lbf/sq. ft.
- I. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for Class 90.

1.6 SUBMITTALS

- A. Product Data: Submit metal building system manufacturer's product information, specifications, and installation instructions for building components and accessories.
- B. Erection Drawings: Submit metal building system manufacturer's erection drawings, including plans, elevations, sections, and details, indicating roof framing, transverse cross-sections, covering and trim details, and accessory installation details to clearly indicate proper assembly of building components.
 1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
 2. Anchor-Bolt Plans: Submit anchor-bolt plans before foundation work begins. Include location, diameter, and projection of anchor bolts required to attach metal building to foundation. Indicate column reactions at each location.

3. Structural-Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.
- C. Certification: Submit written "Certificate of design and manufacturing conformance" prepared and signed by a Professional Engineer, registered to practice in Wisconsin verifying that the metal building system design and metal roof system design (including panels, clips, and support system components) meet indicated loading requirements and codes of authorities having jurisdiction.
1. Certification shall reference specific dead loads, live loads, snow loads, wind loads/speeds, tributary area load reductions (if applicable), concentrated loads, collateral loads, seismic loads, end-use categories, governing code bodies, including year, and load applications.
- D. Color chart for Initial Selection: For each type of building component with factory-applied color finish.
- E. Samples for Verification: For each type of exposed finish required, prepared on Samples of minimum 6" x 6" size.
- F. Warranties: Special warranties specified in this Section.

1.7 QUALITY ASSURANCE

- A. Erector Qualifications: An experienced erector who has specialized in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.
- B. Structural Steel: Comply with AISC's "Specification for Structural Steel Buildings-- Allowable Stress Design, Plastic Design," or AISC's "Load and Resistance Factor Design Specification for Structural Steel Buildings," for design requirements and allowable stresses.
- C. Cold-Formed Steel: Comply with AISI's "Specification for the Design of Cold-Formed Steel Structural Members," or AISI's "Load and Resistance Factor Design Specification for Steel Structural Members," for design requirements and allowable stresses.
- D. Fire-Resistance Ratings: Where indicated, provide metal panel assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.
1. Combustion Characteristics: ASTM E 136.
 2. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.
 3. Metal panels shall be identified with appropriate markings of applicable testing and inspecting agency.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, sheets, panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness and with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

1.9 COORDINATION

- A. Coordinate size and location of concrete foundations and casting of anchor-bolt inserts into foundation walls and footings. Concrete, reinforcement, and formwork requirements are specified in Division 3 Section "Cast-in-Place Concrete."
- B. Coordinate installation of accessories which are specified in Division 7 Section "Roof Accessories."
- C. Coordinate metal panel assemblies with rain drainage work, flashing, trim, and construction of supports and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.10 WARRANTY

- A. Special Warranty on Metal Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.
- B. Special Weathertightness Warranty for Standing-Seam Metal Roof Panels: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam, metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.

1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers listed below. No other manufacturers will be considered unless approved in advance by the Architect.

1. American Buildings Company.
2. Butler Manufacturing Company.
3. Nucor Building Systems
4. VP Buildings, Inc.
5. Inland Buildings.

2.2 STRUCTURAL-FRAMING MATERIALS

- A. W-Shapes: ASTM A 992/A 992M; ASTM A 572/A 572M, Grade 50; or ASTM A 529/A 529M, Grade 50.
- B. Channels, Angles, M-Shapes, and S-Shapes: ASTM A 36/A 36M.
- C. Plate and Bar: ASTM A 36/A 36M; unless ASTM A 572/A 572M, Grade 50 or ASTM A 529/A 529M, Grade 50 required for plate in main building components.
- D. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
- E. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B or C, structural tubing.
- F. Structural-Steel Sheet: Hot-rolled, ASTM A 1011/A 1011M, Structural Steel (SS), Grades 30 through 55, or High-Strength Low Alloy Steel (HSLAS), Grades 45 through 70; or cold-rolled, ASTM A 1008/A 1008M, Structural Steel (SS), Grades 25 through 80, or High-Strength Low Alloy Steel (HSLAS), Grades 45 through 70.
- G. Non-High-Strength Bolts, Nuts, and Washers: ASTM A 307, Grade A, carbon-steel, hex-head bolts; ASTM A carbon-steel hex nuts; and ASTM F 844 plain (flat) steel washers.
 1. Finish: Plain.
- H. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
 1. Finish: Plain.
 2. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F 1852, Type 1, heavy-hex-head steel structural bolts with splined ends.

- a. Finish: Plain.
- I. High-Strength Bolts, Nuts, and Washers: ASTM A 490, Type 1, heavy hex steel structural bolts or tension-control, bolt-nut-washer assemblies with splined ends; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers, plain.
- J. Unheaded Anchor Rods: ASTM F 1554, Grade 36, ASTM A 36, ASTM A 307, Grade A or ASTM A 572/A 572M, Grade 50, as required by design.
 - 1. Configuration: Straight.
 - 2. Nuts: ASTM A 563 hex carbon steel.
 - 3. Plate Washers: ASTM A 36 carbon steel.
 - 4. Washers: ASTM F 436 hardened carbon steel.
 - 5. Finish: Plain.
- K. Headed Anchor Rods: ASTM F 1554, Grade 36 or ASTM A 307, Grade A, straight.
 - 1. Nuts: ASTM A 563 hex carbon steel.
 - 2. Plate Washers: ASTM A 36 carbon steel.
 - 3. Washers: ASTM F 436 hardened carbon steel.
 - 4. Finish: Plain.
- L. Threaded Rods: ASTM A 193; ASTM A 572, Grade 50; ASTM A 36; ASTM A 307, Grade A; any as required by design.
 - 1. Nuts: ASTM A 563 hex carbon steel.
 - 2. Washers: ASTM F 436 hardened steel.
 - 3. Finish: Plain.
- M. Primer: SSPC-Paint 15, Type I, red oxide.

2.3 METAL ROOF SYSTEM

- A. Basis of design: manufacturer's standard standing seam roof system.
 - 1. Seams shall be designed for field assembly using a seaming machine that is provided by the PEMB manufacturer.
- B. Roof System Design:
 - 1. Design roof panels in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
 - 2. Design roof paneling system to support design live, snow, and wind loads.
 - 3. Endwall Trim and Roof Transition Flashings: Allow roof panels to move relative to wall panels and/or parapets as roof expands and contracts with temperature changes.

- C. Roof System Performance Testing:
1. UL Wind Uplift Classification Rating, UL 580: Class 90.
 2. Structural Performance Under Uniform Static Air Pressure Difference: Test roof system in accordance with ASTM E 1592.
- D. Roof Panels:
1. Factory roll-formed, 24 inches wide, with 2 major corrugations, 2 inches high (2-3/4 inches including seam), 24 inches on center.
 2. Flat of the Panel: Cross flutes 6 inches on center, perpendicular to major corrugations in entire length of panel to reduce wind noise.
 3. Variable Width Panels:
 - a. For roof lengths not evenly divisible by the 2'-0" panel width, factory-manufactured variable-width (9-inch, 12-inch, 15-inch, 18-inch, and 21-inch-wide) panels shall be used to ensure modular, weathertight roof installation.
 - b. Supply maximum possible panel lengths.
 4. Panel Material and Finish:
 - a. 24-gauge steel coated both sides with layer of Galvalume aluminum-zinc alloy (approximately 55 percent aluminum, 45 percent zinc) applied by continuous hot-dip method.
 - b. Minimum 0.55-ounce coated weight per square foot as determined by triple-spot test, ASTM A 792.
 5. Use panels of maximum possible lengths to minimize end laps.
 6. Extend eave panels beyond structural line of sidewalls.
 7. Factory punch panels at panel end to match factory-punched holes in eave structural member.
 8. Panel End Splices: Factory punched and factory notched.
 9. Panel End Laps: Locate directly over, but not fastened to, a supporting secondary roof structural member and be staggered, to avoid 4-panel lap-splice condition.
 10. End Laps: Floating. Allows roof panels to expand and contract with roof panel temperature changes.
 11. Self-Drilling Fasteners: Not permitted in weathering membrane of roof system.
 12. Ridge Assembly:
 - a. Design ridge assembly to allow roof panels to move lengthwise with expansion and contraction as roof panel temperature changes.
 - b. Factory punch parts for correct field assembly.
 - c. Install panel closures and interior reinforcing straps to seal panel ends at ridge.
 - d. Do not expose attachment fasteners on weather side.
 - e. Use lock seam plug to seal lock seam portion of panel.

- f. High-Tensile Steel Ridge Cover: Span from panel closure to panel closure and flex as roof system expands and contracts.

2.4 WALL PANEL SYSTEMS

- A. Basis of design:
 1. "Panel Rib Wall" panel by Varco Pruden, or equal by other manufacturers.
- B. Wall System Design: Design wall panels in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
- C. Wall Panels:
 1. Roll-formed panels, 3 feet wide, 26 gauge steel.
 2. Major Rib Spacing: 12 inches on center.
 3. Rib Height: 1 1/4 inches.
 4. One piece from base to building eave.
 5. Finish:
 - a. High-Performance Organic Finish (3-Coat Fluoropolymer): AA-C12C40R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: conversion coating; Organic Coating: manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with AAMA standard and with coating and resin manufacturers' written instructions
 - b. Metal panels, PNL-2 & PNL-3: provide custom mettalic color to match Architect's sample.
- D. Fasteners:
 1. Fasteners: Self-drilling or self-tapping, zinc-plated, hex-head carbon-steel screws, with nylon or polypropylene washer.
 2. Fastener Locations: Indicated on erection drawings furnished by metal building system manufacturer.
 3. Exposed Fasteners: Factory painted to match wall color.

2.5 LINER PANEL SYSTEMS

- A. System Design: Design wall panels in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
- B. Tapered-Rib-Profile, Metal Liner Panels: Formed with raised, trapezoidal major ribs and intermediate stiffening ribs symmetrically spaced between major ribs; designed to be installed by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps.

1. Material: 28 gauge steel
 - a. Exterior Finish: Acrylic enamel.
 - b. Color: Manufacturer's standard white.
 2. Major-Rib Spacing: 6 to 12 inches.
 3. Panel Coverage: 36 inches
 4. Panel Height: 1 inch nominal.
- C. Fasteners:
1. Exposed Fasteners: Provide factory painted to match panel color.

2.6 THERMAL INSULATION FOR FIELD-ASSEMBLED METAL PANELS

- A. Metal Building Insulation: Owens-Corning Fiberglas "Certified R", NAIMA 202, or equal, with flame-spread index of 25 or less.
- B. Roof and Wall Insulation Facing: PSK Standard Duty (WMP-10)
1. 0.0015-inch-thick, UV-stabilized, white metalized polypropylene laminated to 14-pound Kraft paper, reinforced with glass-fiber scrim.
 2. Adhere facing to fiberglass blanket.
 3. Assembly of Insulation Blanket and Facing:
 - a. Flame Spread Rating: Less than 25.
 - b. UL Label: Submit as specified in Submittals article of this section.
 - c. Perm Rating: 0.02.
- C. Retainer Strips: 0.019-inch-thick, formed, galvanized steel or PVC retainer clips colored to match insulation facing.
- D. Insulation support for full depth roof insulation: Insul Basket or equal.
- E. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.7 MISCELLANEOUS MATERIALS

- A. Metal Panel Sealants:
1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape of manufacturer's standard size.
 2. Joint Sealant: ASTM C 920; one-part elastomeric polyurethane, polysulfide, or silicone-rubber sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended by metal building system manufacturer.

2.8 FABRICATION, GENERAL

- A. General: Design components and field connections required for erection to permit easy assembly.
 - 1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
 - 2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members shall be free of cracks, tears, and ruptures.
- B. Tolerances: Comply with MBMA's "Metal Building Systems Manual": Chapter IV, Section 9, "Fabrication and Erection Tolerances."
- C. Metal Panels: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.
 - 1. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

2.9 STRUCTURAL FRAMING

- A. General:
 - 1. Primary Framing: Shop fabricate framing components to indicated size and section with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.
 - a. Make shop connections by welding or by using high-strength bolts.
 - b. Join flanges to webs of built-up members by a continuous submerged arc-welding process.
 - c. Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin or girt web, so flange compressive strength is within allowable limits for any combination of loadings.
 - d. Weld clips to frames for attaching secondary framing members.
 - e. Shop Priming: Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary structural members with specified primer after fabrication.
 - 2. Secondary Framing: Shop fabricate framing components to indicated size and section by roll-forming or break-forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.

- a. Make shop connections by welding or by using non-high-strength bolts.
 - b. Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary structural members with specified primer after fabrication.
- B. Primary Framing: Manufacturer's standard structural primary framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafter, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing.
 - 1. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated.
 - a. Slight variations in span and spacing may be acceptable if necessary to meet manufacturer's standard, as approved by Architect.
 - 2. Rigid Clear-Span Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Interior columns are not permitted.
- C. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly to comply with the following:
 - 1. End-Wall and Corner Columns: I-shaped sections fabricated from structural-steel shapes; shop-welded, built-up steel plates; or C-shaped, cold-formed, structural-steel sheet; with minimum thickness of 0.0598 inch.
 - 2. End-Wall Rafters: C-shaped, cold-formed, structural-steel sheet; with minimum thickness of 0.0598 inch; or I-shaped sections fabricated from shop-welded, built-up steel plates or structural-steel shapes.
- D. Secondary Framing: Manufacturer's standard secondary framing members, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Fabricate framing from cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet prepainted with coil coating, unless otherwise indicated, to comply with the following:
 - 1. Purlins: C- or Z-shaped sections; fabricated from minimum 0.0598-inch-thick steel sheet, built-up steel plates, or structural-steel shapes; minimum 2-1/2-inch-wide flanges.
 - a. Depth: As indicated on Drawings or as required to comply with system performance requirements
 - 2. Purlins: Where indicated, provide steel joists of depths indicated.
 - 3. Girts: C- or Z-shaped sections; fabricated from minimum 0.0598-inch-thick steel sheet, built-up steel plates, or structural-steel shapes. Form ends of Z-sections

with stiffening lips angled 40 to 50 degrees to flange and with minimum 2-1/2-inch- wide flanges.

- a. Depth As indicated on Drawings or as required to comply with system performance requirements
 - b. Eave Struts: Unequal-flange, C-shaped sections; fabricated from 0.0598-inch thick steel sheet, built-up steel plates, or structural-steel shapes; to provide adequate backup for metal panels.
4. Flange Bracing: Minimum 2-by-2-by-1/8-inch structural-steel angles or 1-inch diameter, cold-formed structural tubing to stiffen primary frame flanges.
 5. Base or Sill Angles: Minimum 3-by-2-by-0.0598-inch zinc-coated (galvanized) steel sheet.
 6. Purlin and Girt Clips: Minimum 0.0598-inch- thick, steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.
 7. Secondary End-Wall Framing: Manufacturer's standard sections fabricated from minimum 0.0598-inch thick, structural-steel sheet.
 8. Framing for Openings: Channel shapes; fabricated from minimum 0.0598-inch thick, cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings, and head, jamb, and sill of other openings.
 9. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.
- E. Bracing: Provide adjustable wind bracing as follows:
1. Bracing: Provide wind bracing using any method specified below, at manufacturer's option.
 2. Rods: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 or ASTM A 529/A 529M, Grade 50; minimum 1/2-inch diameter steel; threaded full length or threaded a minimum of 6 inches at each end.
 3. Cable: ASTM A 475, 1/4-inch diameter, extra-high-strength grade, Class B zinc-coated, 7-strand steel; with threaded end anchors.
 4. Angles: Fabricated from structural-steel shapes to match primary framing, of size required to withstand design loads.
 5. Rigid Portal Frames: Fabricate from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
- F. Bolts: Provide plain finish bolts for structural-framing components that are primed or finish painted. Provide galvanized bolts for structural-framing components that are galvanized.
- G. Factory-Primed Finish: Apply specified primer immediately after cleaning and pretreating.
1. Prime primary, secondary, and end-wall structural-framing members to a minimum dry film thickness of 1 mil.

- a. Prime secondary steel framing formed from uncoated steel sheet to a minimum dry film thickness of 0.5 mil on each side.
2. Prime galvanized members with specified primer, after phosphoric acid pretreatment.

2.10 ACCESSORIES

- A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.
 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
- B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels, unless otherwise indicated.
 1. Closures: Provide closures at eaves and ridges, fabricated of same material as metal roof panels.
 2. Clips: Manufacturer's standard, formed from steel sheet, designed to withstand negative-load requirements.
 3. Cleats: Manufacturer's standard, mechanically seamed.
 4. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 5. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
 6. Thermal Spacer Blocks: Where metal panels attach directly to purlins, provide thermal spacer blocks of thickness required to provide 1 inch standoff; fabricated from extruded polystyrene.
- C. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels, unless otherwise indicated.
 1. Closures: Provide closures at eaves and rakes, fabricated of same material as metal wall panels.
 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.

3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch thick, flexible closure strips; cut or premolded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- D. Flashing and Trim: Formed from material to match wall panels, in color selected by Architect from full range of manufacturer's standard colors.
1. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers.
- E. Gutters: Formed from material to match wall panels, in color selected by Architect from full range of manufacturer's standard colors. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required, sized according to SMACNA's "Architectural Sheet Metal Manual."
1. Gutter Supports: Fabricated from same material and finish as gutters; spaced maximum of 36 inches o.c.
 2. Strainers: Bronze, copper, or aluminum wire ball type at outlets.
- F. Downspouts: Formed from material to match wall panels, in color selected by Architect from full range of manufacturer's standard colors. Fabricate in minimum 10-foot long sections, complete with formed elbows and offsets.
1. Mounting Straps: Fabricated from same material and finish as gutters
- G. Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.
- H. Snow Guards:
1. Basis-of-Design Product: Subject to compliance with requirements, provide "Sno Gem Original" as manufactured by Sno Gem, Inc., 4800 Metalmaster Way, McHenry, IL, 60050; or comparable product by one of the following:
 - a. Alpine SnowGuards; a division of Vermont Slate & Copper Services, Inc.
 - b. Berger Building Products.
 - c. PMC Industries, Inc.
 - d. Roofers Edge.
 - e. Sieger Snow Guards Inc.
 - f. SnoGuard.
 - g. TRA-MAGE, Inc.
 - h. Zaleski Snow-Guards for Roofs, Inc.
 - i. Architect pre-approved equal.
 2. Location:

- a. Provide snow guards on the roof of Building E only.
- b. Provide three rows of snow guards parallel to the low edge of the roof @ 12" o.c. horizontally between ribs of metal roof.
- c. Locate the first row 24 inches from roof edge. Locate two additional rows @ 10 feet o.c.

2.11 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
- B. Proceed with erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition.
- B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place, unless otherwise indicated.

3.3 ERECTION OF STRUCTURAL FRAMING

- A. Erect metal building system according to manufacturer's written erection instructions and erection drawings.
- B. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.

- C. Set structural framing accurately in locations and to elevations indicated and according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.
- D. Base Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- E. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
 - 1. Level and plumb individual members of structure.
 - 2. Make allowances for difference between temperature at time of erection and mean temperature when structure will be completed and in service.
- F. Primary Framing and End Walls: Erect framing true to line, level, plumb, rigid, and secure. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist cure grout for not less than seven days after placement.
 - 1. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
 - a. Joint Type: Snug tightened or pretensioned.
- G. Secondary Framing: Erect framing true to line, level, plumb, rigid, and secure. Fasten secondary framing to primary framing using clips with field connections using non-high-strength bolts.
 - 1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
 - 2. Locate and space wall girts to suit openings such as doors and windows.
 - 3. Locate canopy framing as indicated.
 - 4. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.
- H. Steel Joists: Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Standard Specifications, Load Tables, and

Weight Tables for Steel Joists and Joist Girders," joist manufacturer's written recommendations, and requirements in this Section.

1. Before installation, splice joists delivered to Project site in more than one piece.
 2. Space, adjust, and align joists accurately in location before permanently fastening.
 3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
 4. Bolt joists to supporting steel framework using carbon-steel bolts, unless otherwise indicated.
 5. Bolt joists to supporting steel framework using high-strength structural bolts, unless otherwise indicated. Comply with RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for high-strength structural bolt installation and tightening requirements.
 6. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.
- I. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.
1. Tighten rod and cable bracing to avoid sag.
 2. Locate interior end-bay bracing only where indicated.
- J. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.
- K. Erection Tolerances: Maintain erection tolerances of structural framing within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.4 METAL PANEL INSTALLATION, GENERAL

- A. Examination: Examine primary and secondary framing to verify that structural panel support members and anchorages have been installed within alignment tolerances required by manufacturer.
1. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before metal panel installation.
- B. General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
1. Field cut metal panels as required for doors, windows, and other openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes.
 - a. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.

2. Install metal panels perpendicular to structural supports, unless otherwise indicated.
 3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
 4. Locate and space fastenings in uniform vertical and horizontal alignment.
 5. Locate metal panel splices over, but not attached to, structural supports with end laps in alignment. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
 6. Lap metal flashing over metal panels to allow moisture to run over and off the material.
- C. Lap-Seam Metal Panels: Install screw fasteners with power tools having controlled torque adjusted to compress neoprene washer tightly without damage to washer, screw threads, or metal panels. Install screws in predrilled holes.
1. Arrange and nest side-lap joints so prevailing winds blow over, not into, lapped joints. Lap ribbed or fluted sheets one full rib corrugation. Apply metal panels and associated items for neat and weathertight enclosure. Avoid "panel creep" or application not true to line.
- D. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.
- E. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal panel manufacturer.
1. Seal metal panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal panel manufacturer.
 2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."

3.5 METAL ROOF PANEL INSTALLATION

- A. General: Provide metal roof panels of full length from eave to ridge, unless otherwise indicated or restricted by shipping limitations.
1. Install ridge caps as metal roof panel work proceeds.
 2. Flash and seal metal roof panels with weather closures at eaves and rakes. Fasten with self-tapping screws.
- B. Field-Assembled, Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended by manufacturer.

1. Install clips to supports with self-tapping fasteners.
2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
3. Seamed Joint: Crimp standing seams with manufacturer-provided motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.
4. Rigidly fasten eave end of metal roof panels and allow ridge end free movement due to thermal expansion and contraction. Predrill panels for fasteners.
5. Provide metal closures at eaves, peaks, and rakes.

3.6 METAL WALL PANEL INSTALLATION

- A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.
 1. Unless otherwise indicated, begin metal panel installation at corners with center of rib lined up with line of framing.
 2. Shim or otherwise plumb substrates receiving metal wall panels.
 3. When two rows of metal panels are required, lap panels 4 inches minimum.
 4. When building height requires two rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
 5. Rigidly fasten base end of metal wall panels and allow eave end free movement due to thermal expansion and contraction. Predrill panels.
 6. Flash and seal metal wall panels with weather closures at eaves, rakes, and at perimeter of all openings. Fasten with self-tapping screws.
 7. Install screw fasteners in predrilled holes.
 8. Install flashing and trim as metal wall panel work proceeds.
 9. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated, or if not indicated, as necessary for waterproofing.
 10. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-tapping screws.
 11. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.
- B. Field-Assembled, Metal Wall Panels: Install metal wall panels on exterior side of girts. Attach metal wall panels to supports with fasteners as recommended by manufacturer.
 1. Field-Insulated Assemblies: Install thermal insulation as specified. Install metal liner panels over insulation on interior side of girts at locations indicated. Fasten with exposed fasteners as recommended by manufacturer.

3.7 THERMAL INSULATION INSTALLATION FOR FIELD-ASSEMBLED METAL PANELS

- A. General: Install insulation concurrently with metal wall panel installation, in thickness indicated to cover entire wall, according to manufacturer's written instructions.

1. Set vapor-retarder-faced units with vapor retarder to warm side of construction, unless otherwise indicated. Do not obstruct ventilation spaces, except for firestopping.
 2. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.
 3. Install factory-laminated, vapor-retarder-faced blankets straight and true in one-piece lengths with both sets of facing tabs sealed to provide a complete vapor retarder.
 4. Install blankets straight and true in one-piece lengths. Install vapor retarder over insulation with both sets of facing tabs sealed to provide a complete vapor retarder.
- B. Blanket Roof Insulation: Comply with the following installation method:
1. Two-Layers-between-Purlin-with-Spacer-Block Installation: Extend insulation and vapor retarder between purlins. Carry vapor-retarder facing tabs up and over purlin, overlapping adjoining facing of next insulation course maintaining continuity of retarder. Install layer of filler insulation over first layer to fill space between purlins formed by thermal spacer blocks. Hold in place with bands and crossbands below insulation.
 2. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.
 3. Thermal Spacer Blocks: Where metal roof panels attach directly to purlins, install thermal spacer blocks.
- C. Blanket Wall Insulation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing members. Hold in place by metal wall panels fastened to secondary framing.
1. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.

3.8 ACCESSORY INSTALLATION

- A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal roof panel assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
 2. Install components for a complete metal wall panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
 3. Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.

- B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
 - 1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
 - 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).
- C. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 4 feet o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.
- D. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.
 - 1. Provide elbows at base of downspouts to direct water away from building.
 - 2. Tie downspouts to underground drainage system if indicated on Drawings.
- E. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.
- F. Snow guards: attach snow guards to roof surface with adhesive as recommended by manufacturer.

3.9 ADJUSTING

- A. Doors: After completing installation, test and adjust doors to operate easily, free of warp, twist, or distortion.
- B. Door Hardware: Adjust and check each operating item of door hardware and each door to ensure proper operation and function of every unit. Replace units that cannot be adjusted to operate as intended.

3.10 CLEANING AND PROTECTION

- A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

- B. Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing and accessories.
- C. Touchup Painting: Cleaning and touchup painting are specified in Division 9 painting Sections.
- D. Metal Panels: Remove temporary protective coverings and strippable films, if any, as metal panels are installed. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
 - 1. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.
- E. Doors and Frames: Immediately after installation, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.

END SECTION 13 34 19

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SECTION 14 24 00 - HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes hydraulic passenger elevator.
- B. Related Requirements:
 - 1. Section 01 50 00 "Temporary Facilities and Controls" for temporary use of elevators for construction purposes.
 - 2. Section 03 30 00 "Cast-in-Place Concrete" for setting sleeves, inserts, and anchoring devices in concrete.
 - 3. Section 04 20 00 "Unit Masonry" for setting sleeves, inserts, and anchoring devices in masonry and for grouting elevator entrance frames installed in masonry walls.
 - 4. Section 05 50 00 "Metal Fabrications" for the following:
 - a. Attachment plates and angle brackets for supporting guide-rail brackets.
 - b. Hoist beams.
 - c. Structural-steel shapes for subsills.
 - d. Pit ladders.
 - 5. Section 22 14 29 "Sump Pumps" for sump pumps, sumps, and sump covers in elevator pits.

1.3 DEFINITIONS

- A. Definitions in ASME A17.1/CSA B44 apply to work of this Section.
- B. Service Elevator: A passenger elevator that is also used to carry freight.

1.4 ACTION SUBMITTALS

- A. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information. Include product data for car enclosures, hoistway entrances, and operation, control, and signal systems.
- B. Shop Drawings:

1. Include plans, elevations, sections, and large-scale details indicating service at each landing, machine room layout, coordination with building structure, relationships with other construction, and locations of equipment.
 2. Include large-scale layout of car-control station.
 3. Indicate maximum dynamic and static loads imposed on building structure at points of support, and maximum and average power demands.
- C. Samples for Initial Selection: For finishes involving color selection.
- D. Samples for Verification: For exposed car, hoistway door and frame, and signal equipment finishes; 3-inch- square Samples of sheet materials; and 4-inch lengths of running trim members.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Seismic Qualification Certificates: For elevator equipment, accessories, and components, from manufacturer.
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- C. Manufacturer Certificates: Signed by elevator manufacturer certifying that hoistway, pit, and machine room layout and dimensions, as shown on Drawings, and electrical service, as shown and specified, are adequate for elevator system being provided.
- D. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For elevators to include in emergency, operation, and maintenance manuals.
1. In addition to items specified in Section 01 78 23 "Operation and Maintenance Data," include diagnostic and repair information available to manufacturer's and Installer's maintenance personnel.
- B. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.
- C. Continuing Maintenance Proposal: Submit a continuing maintenance proposal from Installer to Owner, in the form of a standard one-year maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

- D. Continuing Maintenance Proposal: Submit a continuing maintenance proposal from Installer to Owner with terms, conditions, and obligations as set forth in, and in same form as, "Draft of Elevator Maintenance Agreement" at end of this Section, starting on date initial maintenance service is concluded.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: Elevator manufacturer or an authorized representative who is trained and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle materials, components and equipment in manufacturer's protective packaging. Store materials, components, and equipment off of ground, under cover, and in a dry location.

1.9 COORDINATION

- A. Coordinate installation of sleeves, block outs, elevator equipment with integral anchors, and other items that are embedded in concrete or masonry for elevator equipment. Furnish templates, sleeves, elevator equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.
- B. Furnish well casing and coordinate delivery with related excavation work.
- C. Coordinate locations and dimensions of other work relating to hydraulic elevators including pit ladders; sumps and floor drains in pits; entrance subsills; electrical service; and electrical outlets, lights, and switches in hoistways, pits, and machine rooms.

1.10 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair, restore, or replace elevator work that fails in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
 - 2. Warranty Period: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Schindler, A330 or comparable product by one of the following:
 - 1. American Crescent Elevator Mfg., Corp.
 - 2. Fujitec America, Inc.
 - 3. Minnesota Elevator, Inc.

4. Mowrey Elevator Co.
5. Schumacher Elevator Co.
6. ThyssenKrupp Elevator.

B. Source Limitations: Obtain elevators from single manufacturer.

1. Major elevator components, including pump-and-tank units, plunger-cylinder assemblies, controllers, signal fixtures, door operators, car frames, cars, and entrances, shall be manufactured by single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with ASME A17.1/CSA B44.

B. Accessibility Requirements: Comply with Section 407 in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and with ICC A117.1.

C. Seismic Performance: Elevator system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 and shall comply with elevator safety requirements for seismic risk Zone 1 or greater in ASME A17.1/CSA B44.

2.3 ELEVATORS

A. Elevator System, General: Manufacturer's standard elevator systems. Unless otherwise indicated, manufacturers' standard components shall be used, as included in standard elevator systems and as required for complete system.

B. Elevator Description:

1. Type: Under-the-car single cylinder.
2. Rated Load: 2500 lb.
3. Freight Loading Class for Service Elevators: Class A.
4. Rated Speed: 125 fpm.
5. Operation System: Single automatic.
6. Car Enclosures:
 - a. Inside Width: 80 inches from side wall to side wall.
 - b. Inside Depth: 51 inches from back wall to front wall (return panels).
 - c. Inside Height: 96 inches to underside of ceiling.
 - d. Car Signal and Control Fixtures: Satin stainless steel, No. 4 finish.
7. Hoistway Entrances:
 - a. Width: 48 inches.
 - b. Height: 84 inches.
 - c. Type: One-speed side sliding.
8. Hall Fixtures at All Floors: Satin stainless steel, No. 4 finish.
9. Additional Requirements:

- a. Provide inspection certificate in each car, mounted under acrylic cover with frame made from satin stainless steel, No. 4 finish.
- b. Provide hooks for protective pads and one complete set(s) of full-height protective pads.
- c. Battery-powered lowering.

2.4 SYSTEMS AND COMPONENTS

- A. Pump Units: Positive-displacement type with a maximum of 10 percent variation between no load and full load and with minimum pulsations.
 1. Pump shall be submersible type with submersible squirrel-cage induction motor, and shall be suspended inside oil tank from vibration isolation mounts or shall be tank-top-mounted type with fan-cooled, squirrel-cage induction motor, and shall be mounted on oil tank with vibration isolation mounts and enclosed in prime-painted steel enclosure lined with 1-inch- thick, glass-fiber insulation board.
 2. Motor shall have wye-delta or solid-state starting.
 3. Motor shall have variable-voltage, variable-frequency control.
- B. Hydraulic Silencers: System shall have hydraulic silencer containing pulsation-absorbing material in blowout-proof housing at pump unit.
- C. Piping: Size, type, and weight of piping as recommended by elevator manufacturer, with flexible connectors to minimize sound and vibration transmissions from power unit.
 1. Cylinder units shall be connected with dielectric couplings.
 2. Casing for Underground Piping: Schedule 40 PVC pipe complying with ASTM D 1785, joined with PVC fittings complying with ASTM D 2466 and solvent cement complying with ASTM D 2564.
- D. Hydraulic Fluid: Elevator manufacturer's standard fluid with additives as needed to prevent oxidation of fluid, corrosion of cylinder and other components, and other adverse effects.
- E. Inserts: Furnish required concrete and masonry inserts and similar anchorage devices for installing guide rails, machinery, and other components of elevator work. Device installation is specified in another Section.
- F. Protective Cylinder Casing: PVC or HDPE pipe casing complying with ASME A17.1/CSA B44, of sufficient size to provide not less than 1-inch clearance from cylinder and extending above pit floor. Casing shall have means of monitoring effectiveness to comply with ASME A17.1/CSA B44.
- G. Car Frame and Platform: Welded or bolted steel units.
- H. Guides: Roller guides; polymer-coated, nonlubricated sliding guides; or sliding guides with guide-rail lubricators. Provide guides at top and bottom of car and counterweight frames.

2.5 OPERATION SYSTEMS

- A. General: Provide manufacturer's standard microprocessor operation system as required to provide type of operation indicated.
- B. Single-Car Battery-Powered Lowering: When power fails, car is lowered to the lowest floor, opens its doors, and shuts down. System includes rechargeable battery and automatic recharging system.

2.6 DOOR REOPENING DEVICES

- A. Infrared Array: Provide door reopening device with uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more light beams shall cause doors to stop and reopen.
- B. Nudging Feature: After car doors are prevented from closing for predetermined adjustable time, through activating door reopening device, a loud buzzer shall sound and doors shall begin to close at reduced kinetic energy.

2.7 CAR ENCLOSURES

- A. General: Provide enameled-steel car enclosures to receive removable wall panels, with car roof, access doors, power door operators, and ventilation.
 - 1. Provide standard railings complying with ASME A17.1/CSA B44 on car tops where required by ASME A17.1/CSA B44.
- B. Materials and Finishes: Manufacturer's standards, but not less than the following:
 - 1. Subfloor: Exterior, underlayment grade plywood, not less than 5/8-inch nominal thickness.
 - 2. Floor Finish: Specified elsewhere in this section.
 - 3. Plastic-Laminate Wall Panels: Plastic laminate adhesively applied to 1/2-inch fire-retardant-treated particleboard with plastic-laminate panel backing and manufacturer's standard protective edge trim. Panels have a flame-spread index of 25 or less, when tested according to ASTM E 84. Plastic-laminate color, texture, and pattern as selected by Architect from plastic-laminate manufacturer's full range.
 - 4. Fabricate car with recesses and cutouts for signal equipment.
 - 5. Fabricate car door frame integrally with front wall of car.
 - 6. Steel Doors: Flush, hollow-metal construction; fabricated from steel sheet.
 - 7. Sight Guards: Provide sight guards on car doors.
 - 8. Luminous Ceiling: Fluorescent light fixtures and ceiling panels of translucent acrylic or other permanent rigid plastic.
 - 9. Handrails: Manufacturer's standard handrails, of shape, metal, and finish indicated.

2.8 HOISTWAY ENTRANCES

- A. Hoistway Entrance Assemblies: Manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Frame size and profile shall accommodate hoistway wall construction.

- B. Fire-Rated Hoistway Entrance Assemblies: Door and frame assemblies shall comply with NFPA 80 and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction based on testing at as close-to-neutral pressure as possible according to NFPA 252 or UL 10B.
 - 1. Fire-Protection Rating: 2 hour.
- C. Materials and Fabrication: Manufacturer's standards, but not less than the following:
 - 1. Steel Frames: Formed from stainless-steel sheet.
 - 2. Steel Doors: Flush, hollow-metal construction; fabricated from stainless-steel sheet.
 - 3. Sills: Extruded metal, with grooved surface, 1/4 inch thick.
 - 4. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M.

2.9 SIGNAL EQUIPMENT

- A. General: Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Fabricate lighted elements with long-life lamps and acrylic or other permanent, non-yellowing translucent plastic diffusers or LEDs.
- B. Car-Control Stations: Provide manufacturer's standard recessed or semirecessed car-control stations. Mount in return panel adjacent to car door unless otherwise indicated.
 - 1. Mark buttons and switches for required use or function. Use both tactile symbols and Braille.
 - 2. Provide "No Smoking" sign matching car-control station, either integral with car-control station or mounted adjacent to it, with text and graphics as required by authorities having jurisdiction.
- C. Swing-Return Car-Control Stations: Provide car-control stations mounted on rear of hinged return panel adjacent to car door and with buttons, switches, controls, and indicator lights projecting through return panel but substantially flush with face of return panel.
 - 1. Mark buttons and switches for function. Use both tactile symbols and Braille.
 - 2. Provide "No Smoking" sign matching car-control station, either integral with car-control station or mounted adjacent to it, with text and graphics as required by authorities having jurisdiction.
- D. Emergency Communication System: Two-way voice communication system, with visible signal, which dials preprogrammed number of monitoring station and does not require handset use. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
- E. Firefighters' Two-Way Telephone Communication Service: Provide flush-mounted cabinet in each car and required conductors in traveling cable for firefighters' two-way telephone communication service.

- F. Car Position Indicator: Provide illuminated, digital-type car position indicator, located above car door or above car-control station. Also, provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served. Include travel direction arrows if not provided in car-control station.
- G. Hall Push-Button Stations: Provide one hall push-button station at each landing.
 - 1. Provide manufacturer's standard wall-mounted units.
 - 2. Equip units with buttons for calling elevator and for indicating applicable direction of travel.
 - 3. Provide telephone jack in each unit for firefighters' two-way telephone communication service.
- H. Hall Lanterns: Units with illuminated arrows; but provide single arrow at terminal landings. Provide one of the following:
 - 1. Manufacturer's standard wall-mounted units, for mounting above entrance frames.
 - 2. Units with flat faceplate for mounting with body of unit recessed in wall and with illuminated elements projecting from faceplate for ease of angular viewing.
- I. Hall Annunciator: With each hall lantern, provide audible signals indicating car arrival and direction of travel. Signals sound once for up and twice for down.
 - 1. At manufacturer's option, audible signals may be placed on cars.
- J. Emergency Pictorial Signs: Fabricate from materials matching hall push-button stations, with text and graphics as required by authorities having jurisdiction, indicating that in case of fire elevators are out of service and exits should be used instead. Provide one sign at each hall push-button station unless otherwise indicated.

2.10 FINISH MATERIALS

- A. General: Provide the following materials for exposed parts of elevator car enclosures, car doors, hoistway entrance doors and frames, and signal equipment as indicated.
- B. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, commercial steel, Type B, exposed, matte finish.
- C. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, commercial steel, Type B, pickled.
- D. Plastic Laminate: High-pressure type complying with NEMA LD 3, Type HGS for flat applications and Type BKV for panel backing.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elevator areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Verify

critical dimensions and examine supporting structure and other conditions under which elevator work is to be installed.

- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Excavation for Cylinder: Drill well hole in each elevator pit to accommodate installation of cylinder; comply with applicable requirements in Section 31 20 00 "Earth Moving."
- B. Provide waterproof well casing as necessary to retain well-hole walls.
- C. Install cylinder in protective casing within well hole. Before installing protective casing, remove water and debris from well hole and provide permanent waterproof seal at bottom of well casing.
 - 1. Fill void space between protective casing and cylinder with corrosion-protective filler.
 - 2. Align cylinders and fill space around protective casing with fine sand.
- D. Install cylinder plumb and accurately centered for elevator car position and travel. Anchor securely in place, supported at pit floor. Seal between protective casing and pit floor with 4 inches of nonshrink, nonmetallic grout.
- E. Install cylinder plumb and accurately centered for elevator car position and travel. Anchor securely in place, supported at pit floor and braced at intervals as needed to maintain alignment. Anchor cylinder guides at spacing needed to maintain alignment and avoid overstressing guides.
- F. Welded Construction: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS workmanship and welding operator qualification standards.
- G. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts to minimize vibration transmission to structure and structure-borne noise due to elevator system.
- H. Install piping above the floor, where possible. Install underground piping in casing.
- I. Lubricate operating parts of systems as recommended by manufacturers.
- J. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with car. Where possible, delay installation of sills and frames until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.
- K. Leveling Tolerance: 1/4 inch, up or down, regardless of load and travel direction.
- L. Set sills flush with finished floor surface at landing. Fill space under sill solidly with nonshrink, nonmetallic grout.

- M. Locate hall signal equipment for elevators as follows, unless otherwise indicated:
1. For groups of elevators, locate hall push-button stations between two elevators at center of group or at location most convenient for approaching passengers.
 2. Place hall lanterns either above or beside each hoistway entrance.
 3. Mount hall lanterns at a minimum of 72 inches above finished floor.

3.3 FIELD QUALITY CONTROL

- A. Acceptance Testing: On completion of elevator installation and before permitting elevator use (either temporary or permanent), perform acceptance tests as required and recommended by ASME A17.1/CSA B44 and by governing regulations and agencies.
- B. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times that tests are to be performed on elevators.

3.4 PROTECTION

- A. Temporary Use: Limit temporary use for construction purposes to one elevator. Comply with the following requirements for each elevator used for construction purposes:
1. Provide car with temporary enclosure, either within finished car or in place of finished car, to protect finishes from damage.
 2. Provide strippable protective film on entrance and car doors and frames.
 3. Provide other protective coverings, barriers, devices, signs, and procedures as needed to protect elevator and elevator equipment.
 4. Do not load elevators beyond their rated weight capacity.
 5. Engage elevator Installer to provide full maintenance service. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleanup, and adjustment as necessary for proper elevator operation at rated speed and capacity. Provide parts and supplies same as those used in the manufacture and installation of original equipment.
 6. Engage elevator Installer to restore damaged work, if any, so no evidence remains of correction. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate, adjust, and maintain elevator(s).
- B. Check operation of each elevator with Owner's personnel present before date of Substantial Completion and again not more than one month before end of warranty period.
- C. Determine that operation systems and devices are functioning properly.

END SECTION 14 24 00