RFB NO. 316021

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

REQUEST FOR BIDS NO. 316021
STONE HOUSE REMODEL
SILVERWOOD COUNTY PARK
771 SILVER LANE
EDGERTON, WISCONSIN

Due Date / Time: **THURSDAY, JANUARY 4, 2018 / 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:

J. ERIC URTES, AIA - PROJECT MANAGER OR RYAN SHORE, CPESC – PROJECT MANAGER
TELEPHONE NO.: 608/266-4798 (ERIC) OR 608/266-4475 (RYAN)
FAX NO.: 608/267-1533
EMAIL: urtes.eric@countyofdane.com or shore@countyofdane.com

SEALS PAGE

BID NO. 316021
PROJECT: SILVERWOOD STONEHOUSE

ARCHITECT
I hereby certify that this drawing, specification or report was prepared by me or under my direct supervision and that I am a duly Registered Architect under the laws of the State of Wisconsin.

A. James Gersich - Registration No. A-3961

Dated: November 8, 2017

SEALS PAGE

BID NO. 316021
PROJECT: SILVERWOOD STONEHOUSE

MEP ENGINEER

I hereby certify that this drawing, specification or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Wisconsin.

Michael E. Hein - Registration No, E-22036

Dated: November 8, 2017

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DIVISION 22 - PLUMBING

22 00 00 – Plumbing

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

23 00 00 – HVAC

DIVISION 26 - ELECTRICAL

26 00 00 – Electrical

26 31 00 – Solar Photovoltaic Systems

DRAWINGS

Plot drawings on (ARCH C), 22" x 34" paper for correct scale or size.

G0.1 – Cover Sheet
AS1.0 – Architectural Site Plan
A1.0 – Basement Floor Plan
A1.1 – First Floor Plan
A1.3 – Roof Plan
A3.0 – Building Sections
A4.0 – Reflected Ceiling Plans
A6.1 – Door and Window Types and Elevations
A7.0 – Enlarged Elevations
A9.0 – Floor Finish Plans
P1.0 – Basement & First Floor UG Plans – Plumbing
P1.1 – First Floor Plan – Plumbing
P2.0 – Plumbing Risers
P3.0 – Plumbing Schedules & Details
H1.0 – Basement Plans – HVAC
H1.1 – First Floor Plan – HVAC
H2.0 – HVAC Schedules
H3.0 – HVAC Details
E1.0 – Basement Plan – Electrical
E1.1 – First Floor Plan – Electrical Lighting
E1.2 – Second Floor Plan – Electrical Power/LV
E2.0 – Electrical Schedules
E3.0 – Electrical Details

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, JANUARY 4, 2018

REQUEST FOR BIDS NO. 316021

STONE HOUSE REMODEL

SILVERWOOD COUNTY PARK

771 SILVER LANE

EDGERTON, WISCONSIN

Dane County is inviting Bids for construction services on the Silverwood County Park Stone House. Project includes dry walling of interior walls and soffits, HVAC, and electrical construction (including a PV Solar Array). Only firms with capabilities, experience & expertise with similar projects should obtain this Request for Bids document & submit Bids.

Request for Bids document may be obtained after **2:00 p.m. on Thursday, November 9, 2017** by downloading it from countyofdane.com/pwbids. Please call J. Eric Urtes, AIA Project Manager, at 608/266-4798, Ryan Shore, CPESC, at 608/266-4475, or our office at 608/266-4018, 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 danepurchasing.com/Account/Login? or obtain one by calling 608/266-4131. Complete Pre-qualification Application for Contractors at countyofdane.com/pwht/BVC_Application.aspx or obtain one by calling 608/266-4029.

A pre-bid facility tour will be held Thursday, November 16, 2017 at 2:00 p.m. at Silverwood County Park, 771 Silver Lane, Edgerton, WI, starting at the Stone House entrance. Bidders are strongly encouraged to attend this tour.

PUBLISH: NOVEMBER 9 & NOVEMBER 16, 2017 - WISCONSIN STATE JOURNAL

NOVEMBER 9 & NOVEMBER 16, 2017 - THE DAILY REPORTER

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 possesses 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: ☐ No: ☐
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: ☐ No: ☐
3	Will your firm meet all bonding requirements as required by applicable law or contract specifications?	Yes: ☐ No: ☐
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: ☐ No: ☐
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: ☐ No: ☐
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: ☐ No: ☐
7	Will your firm fully abide by the equal opportunity and affirmative action requirements of all applicable laws, including County ordinances?	Yes: ☐ No: ☐
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: ☐ No: ☐ 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: ☐ No: ☐ 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: ☐ No: ☐ If Yes, attach details.
11	In the past three (3) years, has your firm defaulted or failed to complete any contract?	Yes: ☐ No: ☐ 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: ☐ No: ☐ 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: ☐ No: ☐ If Yes, attach details.
14	Is your firm Executive Order 108 precertified with the State of Wisconsin?	Yes: No: ☐
15	Is your firm an active Wisconsin Trade Trainer as determined by the Wisconsin Bureau of Apprenticeship Standards?	Yes: ☐ No: ☐
16	Is your firm exempt from being pre-qualified with Dane County?	Yes: ☐ No: ☐ 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: ☐ No: ☐
18	Contractor has been in business less than one year?	Yes: ☐ No: ☐
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: ☐ No: ☐
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: ☐ No: ☐

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,
HGHWAY & 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

INSTRUCTIONS TO BIDDERS

TABLE OF CONTENTS

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 is scheduled on November 16, 2017 at 2:00 p.m. at Silverwood County Park, 771 Silver Lane, Edgerton. 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

E. Drawings and Specifications that form part of this Contract, as stated in Article 1 of General Conditions of Contact, are enumerated in Document Index of these Construction Documents.

F. Complete sets of Drawings and Specifications for all trades will be available 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.

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 Owner or Architect / Engineer's attention at least ten (10) calendar days before Bid Due Date. Prompt clarification will be available to all bidders by Addendum.

B. Failure to so 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. Owner or Architect / Engineer will not be responsible for verbal instructions.

4. QUALIFICATIONS OF BIDDER (CONTRACTOR AND SUBCONTRACTOR)

A. Before award of Contract can be approved, Owner 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. 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 Owner 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 Owner 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. Owner reserves right to reject Bid if evidence submitted by, or investigation of, bidder fails to satisfy Owner 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) business 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 (3) lowest qualified, responsible bidders, will be returned to their makers within three (3) business 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) calendar 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 Owner 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 twenty-five (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) business days of 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) business 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 may solicit bids from this ESB listing: pdf.countyofdane.com/commissions/2013-2015_Targeted_Business_Directory.pdf.

G. **ESB Certification.** All contractors, subcontractors and suppliers seeking ESB certification must complete and submit Emerging Small Business Report 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) business 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 twenty-four (24) hours 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 Owner accepted alternates.

2. Owner 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. Wisconsin Statute 77.54 (9m) allows building materials that become part of local unit government facilities to be exempt from sales & use tax. Vendors & materials suppliers may not charge Bidders sales & use tax on these purchases. This does not include highways, streets or roads. Any other Sales, Consumer, Use & other similar taxes or fees required by law shall be included in Bid.

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 due time 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 or emailed 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. Not Applicable.

17. UNIT PRICES

A. Not Applicable.

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. Refer to Article 20 of General Conditions of Contract, titled "Time for Completion".

19. WORK BY OWNER

A. Not Applicable.

20. SPECIAL HAZARDS COVERAGE

A. Not Applicable.

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: _____

EMAIL ADDRESS: _____

FORM B

DANE COUNTY (Copy this Form as necessary to provide complete information)
EMERGING SMALL BUSINESS REPORT - INVOLVEMENT

COMPANY NAME: _____

PROJECT NAME: _____

BID NO.: _____ BID DUE DATE: _____

ESB NAME: _____

CONTACT PERSON: _____

ADDRESS: _____

_____

PHONE NO & EMAIL.: _____

_____

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

ESB NAME: _____

CONTACT PERSON: _____

ADDRESS: _____

_____

PHONE NO & EMAIL.: _____

_____

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

FORM C

DANE COUNTY (Copy this Form as necessary to provide complete information)
EMERGING SMALL BUSINESS REPORT - CONTACTS

COMPANY NAME: _____

PROJECT NAME: _____

BID NO.: _____ BID DUE DATE: _____

	ESB FIRM NAME CONTACTED	DATE	PERSON CONTACTED	DID ESB BID?	ACC-EPT BID?	REASON FOR REJECTION
1)						
2)						
3)						
4)						
5)						
6)						
7)						
8)						

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

Name of Bidding Firm: _____

BID FORM

BID NO. 316021
PROJECT: STONE HOUSE REMODEL
SILVERWOOD COUNTY PARK

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

NOTE: WISCONSIN STATUTE 77.54 (9M) ALLOWS FOR NO SALES & USE TAX ON THE PURCHASE OF MATERIALS FOR COUNTY PUBLIC WORKS PROJECTS.

BASE BID - LUMP SUM:
Project includes dry walling of interior walls and soffits, HVAC, and electrical construction (including a PV Solar Array). 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 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

ALTERNATE BID 1 - LUMP SUM:
Deduct price from the base bid for removing all work associated with the installation of gutters, downspouts, and snow guards.

_____ and _____ /100 Dollars
Written Price

$_____
Numeric Price (circle: Add or Deduct)

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

Addendum No(s). _____ through _____

Dated _____

Dane County Land and Water Resources Department must have this project completed by June 30, 2018. Assuming this Work can be started by February 6, 2018, what dates can you commence and complete this job?

Commencement Date: _____ Completion Date: _____
(final, not substantial)

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 sixty (60) calendar 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
☐ Project Experience / Reference Summary – attach separate sheet with list of projects

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 25.13. 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 bid, application or proposal for a contract or agreement 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.

Include this completed Certification with your bid, application or proposal.

COUNTY OF DANE

PUBLIC WORKS CONSTRUCTION CONTRACT

Contract No. _____ Bid No. 316021

Authority: 2018 RES -_____

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

W I T N E S S E T H :

WHEREAS, COUNTY, whose address is c/o Assistant Public Works Director, 1919 Alliant Energy Center Way, Madison, WI 53713, desires to have CONTRACTOR provide Stone House Remodel at Silverwood County Park ("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 Dimension IV (hereinafter referred to as "the Architect / Engineer"), and as enumerated in the Project Manual Table of Contents, 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) business 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 25.13 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) business 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

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)

BOND AMOUNT:

PROJECT:
(Name, location or address, and Project number, if any)

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

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

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner 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. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, 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. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this day of

(Witness)	*(Contractor as Principal)* *(Seal)*
	(Title)
(Witness)	*(Surety)* *(Seal)*
	(Title)

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

Init.
/

AIA® Document A312™ – 2010

Performance Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)

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

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

AIA Document A312–2010 combines two separate bonds, a Performance Bond and a Payment Bond, into one form. This is not a single combined Performance and Payment Bond.

CONSTRUCTION CONTRACT
Date:

Amount:

Description:
(Name and location)

BOND
Date:
(Not earlier than Construction Contract Date)

Amount:

Modifications to this Bond: ☐ None ☐ See Section 16

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:	Name	Name and Title:	

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)

AGENT or **BROKER:**

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

§ 1 The Contractor and 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 when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

.1 the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. 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;

.2 the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

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

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

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

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

§ 5.3 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 a 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 Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right 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, make payment to the Owner; or

.2 Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven 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 Section 5.4, and the Owner refuses the payment 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.

§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, 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. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

.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 Section 5; and

.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.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 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, successors and assigns.

§ 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 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 a declaration of 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.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 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. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 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.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

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

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address		Address	

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

AIA® Document A312™ – 2010

Payment Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status 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 Section 18

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:	Name	Name and Title:	

(Any additional signatures appear on the last page of this Payment Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)
AGENT or **BROKER:**

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

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

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

AIA Document A312–2010 combines two separate bonds, a Performance Bond and a Payment Bond, into one form. This is not a single combined Performance and Payment Bond.

§ 1 The Contractor and 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, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

.2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 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 Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

§ 10 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 the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 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.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, 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.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 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. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- **.1** the name of the Claimant;
- **.2** the name of the person for whom the labor was done, or materials or equipment furnished;
- **.3** a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- **.4** a brief description of the labor, materials or equipment furnished;
- **.5** the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- **.6** the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- **.7** the total amount of previous payments received by the Claimant; and
- **.8** the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 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 Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. 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.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

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

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address		Address	

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

EQUAL BENEFITS COMPLIANCE PAYMENT CERTIFICATION FORM

PURPOSE

25.13 of the Dane County Ordinance requires that each contractor receiving payment for contracted services must certify that he or she has complied fully with the requirements of Chapter 25.13 "Equal Benefits Requirement" of the Dane County Ordinances. Such certification must be submitted prior to the final payment on the contract.

This form should be included with a copy of the final contract invoice forwarded to your contract representative at Dane County.

CERTIFICATION

I, _____ certify that
Printed or Typed Name and Title

_____
Printed or Typed Name of Contractor

has complied fully with the requirements of Chapter 25.13 of the Dane County Ordinances "Equal Benefits Requirements".

Signed _____

Date _____

For questions on this form, please contact Chuck Hicklin at 608-266-4109 or your contract representative at Dane County.

GENERAL CONDITIONS OF CONTRACT

TABLE OF CONTENTS

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 Manager 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 Manager is appointed by and responsible to Department. Public Works Project Manager 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 Manager 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 omissions 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 Manager.

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 Manager 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 is 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 Manager's instructions require any work to be specially tested or approved, Contractor shall give Architect /

Engineer and Public Works Project Manager 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 Manager 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 Manager 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 as stated in Construction Documents.

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 Manager 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 Manager'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) business 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 Manager 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) business 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) business 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) business 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 Manager.

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 labor 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 Manager.

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 Manager.

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.

B. Submit these estimates for approval first to Architect / Engineer, then to Public Works Project Manager. 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.

C. 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.

D. Contractor shall submit for approval first to Architect / Engineer, and then to Public Works Project Manager 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.

E. 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) business days from receipt of payment.

F. Payments by County will be due within forty-five (45) business days after receipt by Department of Application and Certificate for Payment.

G. 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 Manager find that progress of the Work corresponds with Construction Schedule. If Architect / Engineer and Public Works Project Manager 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.

H. 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.

I. County will make final payment within sixty (60) calendar 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.

J. 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.

K. 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, workers, 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 (5^{th}) business 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) business 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 MANAGER'S AUTHORITY

A. Public Works Project Manager 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 Manager.

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 Manager.

D. Where guarantees or warrantees 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 no 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) business 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 affect 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) business 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 25.13, 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 Manager, 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, worker 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 Statue 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 Assistant Public Works Director the 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 then $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 50.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 50.A.2 & 50.A.3. 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) business days written notice has been received by Risk Manager."

B. Builder's Risk:
   1. County shall provide Builder's Risk insurance coverage for its insurable interests in construction or renovation projects with completed value of $500,000 or less. Therefore, if project completed value is more than $500,000, Contractor shall obtain and maintain in force, at its own expense, Builder's Risk Insurance on all risks for amount equal to full completed value of covered structure or replacement value of alterations or additions. Any deductible shall not exceed $25,000 for each loss. Policy shall include occupancy clause and list Dane County as loss payee.

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.

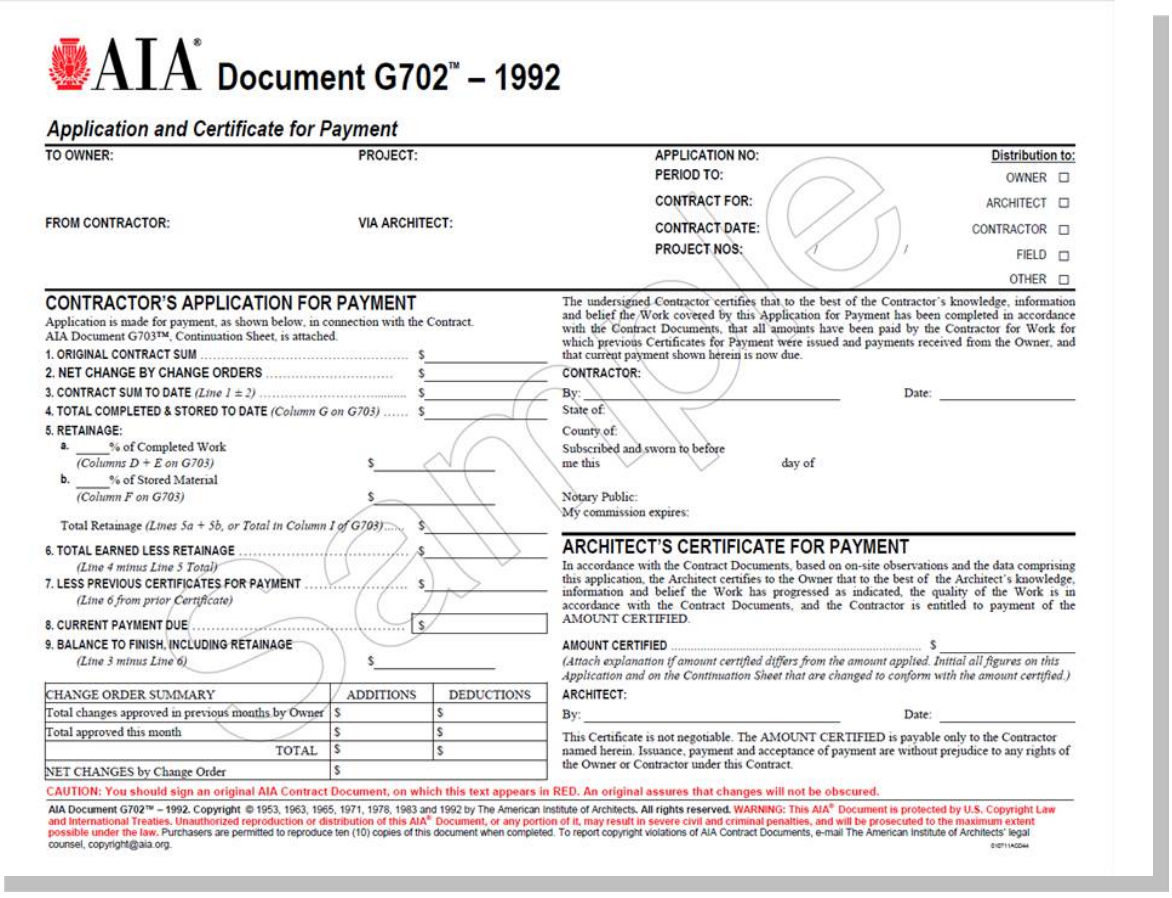
51. WISCONSIN LAW CONTROLLING

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.

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 / Engineer for approval.



AIA® Document G702™ – 1992

Application and Certificate for Payment

TO OWNER: PROJECT: APPLICATION NO: Distribution to:
PERIOD TO: OWNER ☐
CONTRACT FOR: ARCHITECT ☐
FROM CONTRACTOR: VIA ARCHITECT: CONTRACT DATE: CONTRACTOR ☐
PROJECT NOS: / / FIELD ☐
OTHER ☐

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
AIA Document G703™, Continuation Sheet, 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 *(Columns D + E on G703)* $
   b. ____% of Stored Material *(Column F on G703)* $
   Total Retainage *(Lines 5a + 5b, or Total in Column I of G703)* ..... $
6. TOTAL EARNED LESS RETAINAGE ..... $ *(Line 4 minus Line 5 Total)*
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT ..... $ *(Line 6 from prior Certificate)*
8. CURRENT PAYMENT DUE ..... $
9. BALANCE TO FINISH, INCLUDING RETAINAGE *(Line 3 minus Line 6)* $

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	$	$
Total approved this month	$	$
TOTAL	$	$
NET CHANGES by Change Order	$	

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 have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:
By: Date:
State of:
County of:
Subscribed and sworn to before me this day of
Notary Public:
My commission expires:

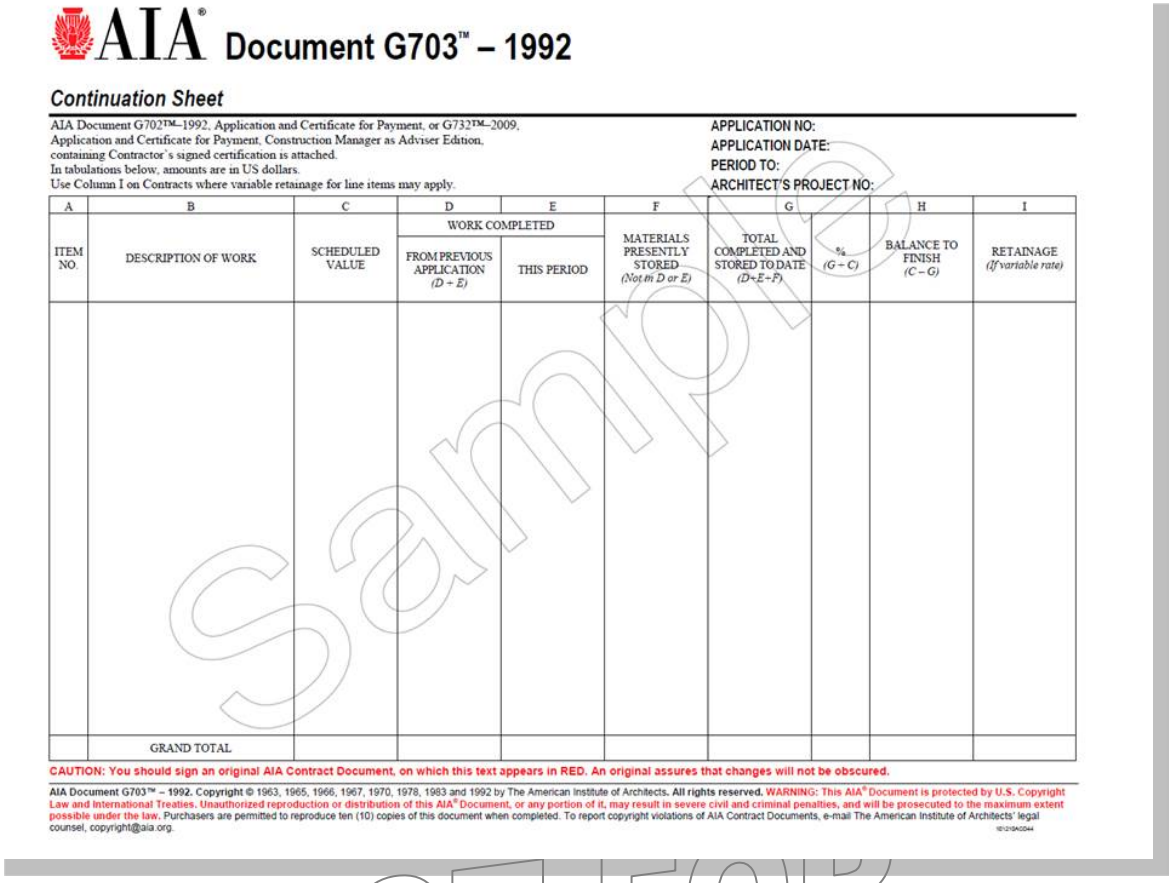
ARCHITECT'S CERTIFICATE FOR PAYMENT

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 if amount certified differs from the amount applied. Initial 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.

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.



AIA® Document G703™ – 1992

Continuation Sheet

AIA Document G702™–1992, Application and Certificate for Payment, or G732™–2009, Application and Certificate for Payment, Construction Manager as Adviser Edition, containing Contractor's signed certification is attached.
In tabulations below, amounts are in US dollars.
Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO:
APPLICATION DATE:
PERIOD TO:
ARCHITECT'S PROJECT NO:

A	B	C	D	E	F	G		H	I
ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	WORK COMPLETED: FROM PREVIOUS APPLICATION (D + E)	WORK COMPLETED: THIS PERIOD	MATERIALS PRESENTLY STORED (Not in D or E)	TOTAL COMPLETED AND STORED TO DATE (D+E+F)	% (G ÷ C)	BALANCE TO FINISH (C – G)	RETAINAGE (If variable rate)
	GRAND TOTAL								

CAUTION: You should sign an original AIA Contract Document, on which this text appears in RED. An original assures that changes will not be obscured.

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2. CONTRACTOR WAGE AFFIDAVIT

A. 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 in form as hereinafter set forth in this section. Affidavit affirms that all persons employed by contractor or by any of contractor's subcontractors on such contract have been paid no less than minimum wages established under Dane County Ordinances, Chapter 40, Subchapter II (Minimum Wage Ordinance) and in effect at date of execution of contract, that full payment of wages earned has been made, and that no rebates either directly or indirectly have been made. Form of such affidavit is included in this section.

B. Form should be included with a copy of the final contract invoice forwarded to your contract representative at Dane County.

DANE COUNTY, WISCONSIN

CONTRACTOR WAGE AFFIDAVIT

COMPANY NAME: _____

ADDRESS: _____

_____

CONTRACT NO.: _____ DIVISION(S) OF WORK: _____

AFFIDAVIT

STATE OF WISCONSIN)
) ss.
DANE COUNTY)

I, _____, being
name and title of person signing affidavit
first duly sworn at _____,
city & state of company incorporation
on oath, depose and say that with respect to the payment of the persons employed by the
_____, subcontractors on the _____
contractor company name division(s) of work
_____, at the _____
building or site of project
that during the period commencing _____, and ending _____
date date
all persons employed on said project have been paid the full wages earned, that no rebates have been or will be made either directly or indirectly by said contractor or subcontractor from the full weekly wages earned by any person, and that no deductions have been made either directly or indirectly from the full weekly wages earned by any person, other than authorized legal deductions (including taxes such as Federal Income Withholding and Social Security, State and
_____,
state any other legal deductions such as union dues, unemployment insurance, 401k contributions, etc., or fill in "N/A"
and that there is full compliance with the provisions and intent of the requirements of Dane County Ordinances, Chapter 40, Subchapter II (Minimum Wage Ordinance). This affidavit is made to induce Dane County to approve the application for payment to which this affidavit is attached.

_____
Contractor Company Name

_____ _____
Signature Title

Sworn to before me this _____ day of _____, 20___.

_____ My Commission expires _____
Notary Public Date

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. Change Procedures
6. Alternates
7. Coordination
8. Conferences
9. Progress Meetings
10. Submittal Procedures
11. Proposed Products List
12. Manufacturers' Instructions
13. Manufacturers' Certificates
14. Quality Assurance / Quality Control of Installation
15. References
16. Interior Enclosures
17. Protection of Installed Work
18. Parking
19. Staging Areas
20. Occupancy During Construction and Conduct of Work
21. Protection
22. Products
23. Transportation, Handling, Storage and Protection
24. Product Options
25. Substitutions
26. Starting Systems
27. Demonstration and Instructions
28. Contract Closeout Procedures
29. Adjusting
30. Operation and Maintenance Data
31. Spare Parts and Maintenance Materials
32. As-Built and 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 dry walling of interior walls and soffits, HVAC construction, and electrical construction as outlined in construction documents.

B. Work by Owner: Not applicable.

C. Permits: Prior to commencement of the Work, Contractor to secure any and all necessary permits for completion of the Work and facility occupancy.

D. Diggers Hotline:
1. It is General Contractor's responsibility to contact Diggers Hotline to have all utility locations marked prior to excavation and planning an excavation in a timely manner so as not to delay the Work.
2. Diggers Hotline shall also be used to obtain information on safe working clearances from overhead lines.
3. Completely comply with all requirements of each affected utility company.
4. It is General Contractor's responsibility to contact & hire private utility locating services if necessary.

1.3 CONTRACTOR USE OF PREMISES

A. Limit use of premises to allow work by Contractors or Subcontractors and access by Owner.

B. Coordinate utility outages and shutdowns with Owner.

1.4 APPLICATIONS FOR PAYMENT

A. Submit two (2) original copies with "wet" signatures of each application on AIA G702™ and G703™ forms or approved contractors invoice form.

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

C. Payment Period: Monthly.

D. Submit Applications for Payment to Public Works Project Manager for approval & processing for payment.

1.5 CHANGE PROCEDURES

A. Change Order Forms: Dane County Contract Change Order, Form 014-32-20 (latest issue).

B. Contractor's costs for Products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from contingency allowance.

1.6 ALTERNATES

A. Alternates quoted on Bid Form shall be reviewed and accepted or rejected at Owner's option.

B. Coordinate related work and modify surrounding work as required.

C. Schedule of Alternates: there are no alternates proposed for this project.

1.7 COORDINATION

A. Coordinate scheduling, submittals, and work of various sections of Specifications to assure efficient and orderly sequence of installation of interdependent construction elements.

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.

D. Public Works Project Engineer may choose to videotape site or workers as the Work progresses.

1.8 CONFERENCES

A. There will be pre-bid conference for this project; see Instructions to Bidders.

B. Owner will schedule a pre-construction conference after Award of Contract for all affected parties.

C. Contractor shall submit Construction Schedule at pre-construction meeting.

D. When required in individual Specification section, convene a pre-installation conference at project site prior to commencing work of Section.

1.9 PROGRESS MEETINGS

A. Schedule and administer meetings throughout progress of the Work at minimum of one (1) per week, with Public Works Project Engineer.

B. Preside at meetings, record minutes, and distribute copies within two (2) business days to those affected by decisions made.

1.10 SUBMITTAL PROCEDURES

A. Submittal form to identify Project, Contractor, Subcontractor or supplier; and pertinent Construction Documents references.

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.

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) business 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 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.

1.13 MANUFACTURERS' CERTIFICATES

A. When specified in individual Specification sections, submit manufacturers' certificate to Public Works Project Manager 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.

1.14 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 fully with manufacturers' instructions.

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

1.15 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 Manager before proceeding.

1.16 INTERIOR ENCLOSURES

A. Provide temporary partitions as required to separate work areas from Owner occupied areas, to prevent distribution of dust and moisture into Owner occupied areas, and to prevent damage to existing materials and equipment.

1.17 PROTECTION OF INSTALLED WORK

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

1.18 PARKING

A. Arrange for temporary parking areas to accommodate construction personnel. Parking shall be available at the Work site.

1.19 STAGING AREAS

A. Coordinate staging areas with Public Works Project Manager prior to starting the Work.

B. On-site space for use as staging areas and storage of materials is limited and will be apportioned among 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.

1.20 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 (8:00 am to 4:30 pm), but confer with Owner, schedule work and store materials so as to interfere as little as possible with normal use of premises. Notify Owner when coring or similar noise making work is to be done and obtain Owner's written approval of schedule. If schedule is not convenient for Owner, reschedule and resubmit new times for Owner approval. Coring of floor along with other noisy work may have to be done on second and third shifts.

B. Work shall be done and temporary facilities furnished so as not to interfere with access to any occupied area and so as to cause least possible interference with normal operation of facility or any essential service thereof.

C. Contractor shall, at all times, provide approved, safe walkways and facility entrances for use by Owner, employees and public.

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. Contractor is not responsible for providing & maintaining temporary toilet facilities.

F. Each Contractor shall arrange with Owner 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 facility. 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.

G. 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.
3. If removal of work exposes discolored or unfinished surfaces or work out of alignment, such surfaces shall be refinished or materials replaced as necessary to make continuous work uniform and harmonious.

1.21 PROTECTION

A. Contractor shall protect from injury all trees, shrubs, hedges, walks and driveways and pay for any damage to same resulting from insufficient or improper protection.

B. Contractor shall provide and maintain barricades & signage to prohibit public access to construction site.

1.22 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.

1.23 TRANSPORTATION, HANDLING, STORAGE AND PROTECTION

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

1.24 PRODUCT OPTIONS

A. Where definite material is specified, it is not intentional to discriminate against "equal" product made by another manufacturer. Intention is to set definite standard of material quality. Should bidder choose to bid materials other than those specified, bidder shall submit said materials specifications to Public Works Project Manager for approval at least seven (7) business days prior to Bid Due Date.

B. Products and materials that are not specified, but have been approved for use by Public Works Project Manager shall be identified in addenda to all bidding contractors.

C. Requests for material or product substitutions submitted after Bid Due Date may be considered. Owner reserves right to approve or reject substitutions based on Specification requirements and intended use.

1.25 SUBSTITUTIONS

A. Public Works Project Manager shall consider requests for Substitutions only within fifteen (15) calendar days after date of Public Works Construction Contract.

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 Bid Due Date.

1.26 STARTING SYSTEMS

A. Provide written notification prior to start-up of each equipment item or system.

B. Ensure that each piece of equipment or system is ready for operation.

C. Execute start-up under supervision of responsible persons in accordance with manufacturers' instructions.

D. Submit written report that equipment or system has been properly installed and is functioning correctly.

1.27 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of Products to Owner's personnel prior to date of final inspection.

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

C. Owner may choose to videotape demonstration session; demonstration and demonstrator shall be to level of satisfaction of Owner.

1.28 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 Manager's inspection.

B. Submit final Application for Payment identifying total adjusted Contract Sum / Price, previous payments, and amount remaining due.

1.29 ADJUSTING

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

1.30 OPERATION AND MAINTENANCE MANUAL

A. Provide operation and maintenance manual for all mechanical and electrical equipment and systems supplied and installed in the Work.

1.31 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.

1.32 AS-BUILT AND 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. Contractor shall furnish Architect / Engineer with original marked up redlines of Construction Documents' drawings and specifications that shall include all Addendums, Change Orders, Construction Bulletins, on-site changes, field corrections, etc. These are project As-Built Drawings & Specifications

B. Architect / Engineer shall update original Construction Documents to include all Addendums & any other changes including those provided by Contractor in As-Built Drawings & Specifications. These updates are project Record Drawings & Specifications.

C. Architect / Engineer shall furnish Public Works Project Manager with Record Drawings as detailed in Professional Services Agreement.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT, DISPOSAL & RECYCLING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Summary
2. Waste Management Goals
3. Construction and / or Demolition Waste Management
4. Waste Management Plan
5. Reuse
6. Recycling
7. Materials Sorting and Storage On Site
8. Lists of Recycling Facilities Processors and Haulers
9. Waste Management Plan Form

B. Related Sections:
1. Section 01 00 00 - Basic Requirements

1.2 WASTE MANAGEMENT GOALS

A. Dane County requires that as many waste materials as possible produced as result of this project be salvaged, reused or recycled in order to minimize impact of construction waste on landfills and to minimize expenditure of energy and cost in fabricating new materials. Additional information may be found in Dane County Green Building Policy, Resolution 299, 1999-2000.

1.3 CONSTRUCTION AND / OR DEMOLITION WASTE MANAGEMENT

A. All construction and demolition waste suitable for recycling may go to Dane County Construction & Demolition Recycling Facility located at 7102 US Hwy 12, Madison, located across from Yahara Hills Golf Course. This facility can receive mixed loads of construction and demolition waste. For complete list of acceptable materials see www.countyofdane.com/pwht/recycle/CD_Recycle.aspx.

B. Dane County Landfill, also at 7102 US Hwy 12, Madison, must receive all other waste from this project. www.countyofdane.com/pwht/recycle/landfill.aspx.

1.4 WASTE MANAGEMENT PLAN

A. Contractor shall develop Waste Management Plan (WMP) for this project. Public Works Project Manager and / or Architect / Engineer may be contacted with questions. Outlined in RECYCLING section of this specification are examples of materials that can be recycled or reused as well as recommendations for waste sorting methods.

B. Contractor shall complete WMP and include cost of recycling / reuse in Bid. WMP will be submitted to Public Works Project Manager within fifteen (15) business days of Bid Due 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.

1.5 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.

1.6 RECYCLING

A. These materials may be recycled at Dane County Construction & Demolition Recycling Facility:
   1. Wood.
   2. Wood Pallets.
   3. PVC Plastic (pipe, siding, etc.).
   4. Asphalt & Concrete.
   5. Bricks & Masonry.
   6. Vinyl Siding.
   7. Cardboard.
   8. Metal.
   9. Unpainted Gypsum Drywall.
   10. Shingles.

B. These materials can be recycled elsewhere in Dane County area:
   1. Fluorescent Lamps.
   2. Foam Insulation & Packaging (extruded and expanded).
   3. Carpet Padding.
   4. Barrels & Drums.

C. All materials must be recycled at WDNR permitted waste processing facilities that adhere to all State Statutes.

1.7 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.

C. Mixed loads of recycled materials are allowed only per instructions at www.countyofdane.com/pwht/recycle/CD_Recycle.aspx.

1.8 LISTS OF RECYCLING FACILITIES PROCESSORS AND HAULERS

A. Refer to www.countyofdane.com/pwht/recycle/CD_Recycle.aspx for information on Dane County Construction & Demolition Recycling Facility.

B. Web site www.countyofdane.com/pwht/recycle/categories.aspx lists current information for Dane County Recycling Markets. Contractors can also contact Jan Neitzel-Knox at 608/266-4029, 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.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

WASTE MANAGEMENT PLAN FORM

Contractor 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 _____ Landfilled _____ Other	Name:_____
Wood	_____ cu. yds. _____ tons	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Wood Pallets	_____ units	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
PVC Plastic	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Asphalt & Concrete	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Bricks & Masonry	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Vinyl Siding	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Cardboard	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Metals	_____ cu. yds. _____ tons	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Unpainted Gypsum / Drywall	_____ cu. yds. _____ tons	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Shingles	_____ cu. yds. _____ tons	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Fluorescent Lamps	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Foam Insulation	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Carpet Padding	_____ cu. ft. _____ lbs.	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Barrels & Drums	_____ units	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____

WASTE MANAGEMENT PLAN FORM

Glass	_____ cu. yds. _____ tons	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Other	_____	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Other	_____	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Other	_____	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Other	_____	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____
Other	_____	_____ Recycled _____ Reused _____ Landfilled _____ Other	Name:_____

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Cast-in-place concrete slabs were poured in Phase 1. In this, Phase 2, a liquid floor treatment is to be applied to the interior slabs.

PART 2 - PRODUCTS

2.1 LIQUID FLOOR TREATMENTS

A. VOC Content: Liquid floor treatments shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

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. ChemMasters; Chemisil Plus.
b. ChemTec Int'l; ChemTec One.
c. Conspec by Dayton Superior; Intraseal.
d. Curecrete Distribution Inc.; Ashford Formula.
e. Dayton Superior Corporation; Day-Chem Sure Hard (J-17).
f. Edoco by Dayton Superior; Titan Hard.
g. Euclid Chemical Company (The), an RPM company; Euco Diamond Hard.
h. Kaufman Products, Inc.; SureHard.
i. L&M Construction Chemicals, Inc.; Seal Hard.
j. Meadows, W. R., Inc.; LIQUI-HARD.
k. Metalcrete Industries; Floorsaver.
l. Nox-Crete Products Group; Duro-Nox.
m. Symons by Dayton Superior; Buff Hard.
n. US SPEC, Division of US Mix Products Company; US SPEC Industraseal.
o. Vexcon Chemicals, Inc.; Vexcon StarSeal PS Clear.

PART 3 - EXECUTION

3.1 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
2. Do not apply to concrete that is less than seven days' old.
3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

END OF SECTION

SECTION 04 20 00

UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Stone units (furnished by Owner, prepared and installed by Contractor) for interior wall base.
2. Mortar and grout.

1.2 SUBMITTALS

A. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

1.3 PROJECT CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 STONE UNITS

A. Salvaged stone units to be supplied by Owner, prepared and installed by Contractor.

2.2 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of Portland cement and hydrated lime containing no other ingredients.

D. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include:

a. Davis Colors; True Tone Mortar Colors.
b. Lanxess Corporation; Bayferrox Iron Oxide Pigments.
c. Solomon Colors, Inc.; SGS Mortar Colors.

E. Aggregate for Mortar: ASTM C 144.

1. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
2. White-Mortar Aggregates: Natural white sand or crushed white stone.
3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

F. Aggregate for Grout: ASTM C 404.

G. Water: Potable.

2.3 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; formulated from neoprene.

B. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

2.4 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other construction stains from masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Diedrich Technologies, Inc.
b. EaCo Chem, Inc.
c. ProSoCo, Inc.

2.5 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Use Portland cement-lime mortar unless otherwise indicated.

B. Mortar for Stone Units: Comply with ASTM C 270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated.

1. For stone units in contact with earth, use Type M.
2. For interior non-load-bearing stone units; and for other applications where another type is not indicated, use Type N.

C. Pigmented Mortar: Use colored cement product.

1. Pigments shall not exceed 10 percent of Portland cement by weight.

D. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.

E. Grout for Stone Units: Comply with ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
2. Proportion grout in accordance with ASTM C 476, Table 1.
3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Use stone units without cutting if possible. If cutting is required to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

B. Select and arrange units for exposed stone units to produce a uniform blend of colors and textures.

3.2 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch.

B. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.
2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.3 LAYING STONE UNIT WALL BASE

A. Lay protection paper layer.

B. Lay out walls in advance for accurate spacing of stone units.

C. Fill space between wall and stone units solidly with mortar unless otherwise indicated.

D. See Drawings for locations and layout description.

3.4 CLEANING

A. In-Progress Cleaning: Clean stone units as work progresses by dry brushing to remove mortar fins and smears.

B. Final Cleaning: After mortar is thoroughly set and cured, clean stone units as follows, if required:

1. Protect surfaces from contact with cleaner.
2. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

3.5 STONE UNIT WASTE DISPOSAL

A. Excess Masonry Waste: Remove excess clean masonry waste, and legally dispose of off Owner's property. Unused stone units shall be returned to Owner.

END OF SECTION

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Additional framing with dimension lumber, in select locations.
2. Wood furring.
3. Miscellaneous wood blocking.
4. Plywood backing panels.

1.2 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product.

1. Include data for wood-preservative and fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the American Lumber Standards Committee Board of Review.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Provide dressed lumber, S4S, unless otherwise indicated.
3. Framing Order Waste Factor Limit: Limit the overall estimates waste factor to 10% or less. Waste factor is defined as the percentage of framing material ordered in excess of the estimated material needed for construction.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC 4a for items in contact with the ground.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
2. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.

C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

E. Application: Treat plywood indicated on Drawings. Treat rough carpentry items indicated on Drawings, and the following:

1. Concealed blocking.
2. Framing for non-load-bearing partitions.

3. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING

A. Maximum Moisture Content: 19 percent.

B. Non-Load-Bearing Interior Partitions: Construction or No. 2 grade of any species.

C. Framing Other Than Non-Load-Bearing Interior Partitions: Construction or No. 2.

1. Species and grade to match existing.

2.5 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Furring.
4. Grounds.

B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content of any species.

C. For concealed boards, provide lumber with 15 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine, No. 2 grade; SPIB.
2. Eastern softwoods, No. 2 Common grade; NeLMA.
3. Northern species, No. 2 Common grade; NLGA.
4. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

2.6 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated where indicated, in thickness indicated or, if not indicated, not less than 1/2-inch nominal thickness.

2.7 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Power-Driven Fasteners: NES NER-272.

C. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

2.8 METAL FRAMING ANCHORS

A. Basis-of-Design Products: Subject to compliance with requirements, provide products by :
   1. Simpson Strong-Tie Co., Inc.

B. Allowable Design Loads: Provide products with allowable design loads, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

C. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

2.9 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch nominal thickness, compressible to 1/32 inch; selected from manufacturer's standard widths to suit width of sill members indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.

C. Metal Framing Anchors: Install metal framing to comply with manufacturer's written instructions.

D. Do not splice structural members between supports, unless otherwise indicated.

E. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

F. Securely attach work to substrate by anchoring and fastening as indicated, complying with the following:

   1. NES NER-272 for power-driven fasteners.
   2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

END OF SECTION

SECTION 06 40 23

INTERIOR ARCHITECTURAL WOODWORK

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Plastic laminate countertops.
2. Cabinets.
3. Wood trim (at doors).

B. Interior architectural woodwork includes wood furring, blocking, shims, and hanging strips unless concealed within other construction before woodwork installation.

1.2 SUBMITTALS

A. Product Data: For each type of product, including finishing materials and processes.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

C. Samples:

1. Lumber for transparent finish, for each species and cut, finished on one side and one edge.

1.3 QUALITY ASSURANCE

A. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards."

1. Custom grade, unless indicated otherwise.

1.4 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.

1.5 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

B. Coordinate work with plumbing rough-in, electrical rough-in, and installation of associated and adjacent components.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of wood indicated for construction, finishes, installation, and other requirements.

B. Wood Species and Cut for Transparent Finish: Maple/Oak.

C. Wood Products to Comply with the Following:

1. Hardboard: AHA A135.4.
2. Particleboard: ANSI A208.1, Grade M-2, made without urea formaldehyde.
3. Veneer-Faced Panel Products (Hardwood Plywood): HPVA HP-1 made without urea formaldehyde.

D. Wood Materials:

1. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of wood and quality grade specified, unless otherwise indicated.
   a. Wood Moisture Content for Interior Materials: 5 to 10 percent.

E. Wood Trim: Hardwood lumber; FS MM-L-736; premium grade in accordance with AWI; maximum moisture content of 6 percent; maple/oak, of quality capable of transparent finish.

F. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or, if not indicated, as required by woodwork quality standard.

1. Manufacturer, Color, Pattern, and Finish: See Room Finish Schedule; furnished and installed by Contractor.

G. Solid-Surface Material: Homogeneous filled polyester, acrylic-modified, cast-polymer solid surface. Colors and patterns run all the way through the product. A repairable and renewable surface.

1. Colors and Patterns: See Room Finish Schedule.

2.2 ACCESSORIES

A. Wood Filler: Oil base, tinted to match surface color.

2.3 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage.

C. VOC Limits for Installation Adhesives and Glues: Use installation adhesives that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Wood Glues: 30 g/L.
2. Contact Adhesive: 250 g/L.

D. Adhesives, General: Do not use adhesives that contain urea formaldehyde.

2.4 FABRICATION

A. General: Complete fabrication to maximum extent possible before shipment to Project site. Where necessary for fitting at site, provide allowance for scribing, trimming, and fitting.

B. Wood Trim:
1. For transparent-finished trim items wider than available lumber, use veneered construction. Do not glue for width.
2. Backout or groove backs of flat trim members and kerf backs of other wide, flat members, except for members with ends exposed in finished work.
3. Assemble casings in plant except where limitations of access to place of installation require field assembly.
4. Door Trim: 3/4" x 4”; maple/oak, clear/transparent stain.

C. Plastic Laminate Cabinets:

1. High-Pressure Decorative Laminate Grade: HGS.
2. Acceptable Manufacturers: See Room Finish Schedule.
3. Colors, Patterns, and Finishes: See Room Finish Schedule.

D. Solid-Surface Countertops:

1. Use molds, materials, methods and procedures that will result in proper texture and finish.
2. Fabricate to required dimensions. To the greatest extent possible, fabricate each unit in one piece. Provide shop-applied backsplashes. Comply with solid-surfacing-material manufacturer’s written recommendations for adhesives, sealers, fabrication, and finishing.
3. All surfaces to be uniform matte. All edges to be erased and sanded smooth.
4. Cure components prior to shipment and remove traces of material that may be toxic or incompatible with other building materials.

5. Colors, Patterns, and Finishes: See Room Finish Schedule.

2.5 SHOP FINISHING

A. Finish architectural woodwork at fabrication shop. Defer only final touchup, cleaning, and polishing until after installation.

B. Back-priming: Apply one coat of sealer or primer, compatible with finish coats, to concealed surfaces of woodwork.

C. Transparent Finish:
1. Grade: Premium.
2. AWI Finish System: Waterborne clear acrylic. Two finish coats of waterborne clear acrylic varnish over a sealer coat and interior wood stain. Wipe wood filler before apply stain.
a. Filler Coat: Open-grain wood filler.
b. Stain Coat: Interior wood stain (semitransparent).
c. Color: See Room Finish Schedule. Verify selection with Owner.
d. Sealer Coat: Clear sanding sealer.
e. Finish Coats: Interior polyurethane-based clear satin finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify mechanical, electrical, and building items affecting work of this Section are placed and ready to receive this work.

3.2 PREPARATION

A. Provide anchoring devices for installation and embedding.

B. Provide templates and rough-in measurements.

3.3 INSTALLATION

A. Before installation, condition woodwork to average prevailing humidity conditions in installation areas. Examine shop-fabricated work for completion and complete work as required, including removal of packing and back-priming.

B. Grade: Install woodwork to comply with requirements for the same grade specified in Part 2 for fabrication of type of woodwork involved.

C. Install woodwork level, plumb, true, and straight to a tolerance of 1/8 inch in 96 inches. Shim as required with concealed shims.

D. Scribe and cut woodwork to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

F. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports to underside of countertop. Caulk space between backsplash and wall with sealant specified in Division 07 “Joint Sealants.”

G. Cabinets: Anchor securely, install level, plumb, true, and straight, as indicated on Drawings.

H. Trim: Install with minimum number of joints possible, using full-length pieces (from maximum length available) to greatest extent possible. Fill gaps, if any, between top of base and wall with plastic wood filler, sand smooth, and finish same as wood base.

I. All finishes must be smooth, uniform in color and match approved samples.

J. Touch up finishing work specified in this Section after installation of woodwork. Fill nail holes with matching filler where exposed.

K. Prior to final inspection, examine installation of the Work of this Section. Repair or replace all defects found. Leave installation clean and undamaged.

3.4 REPAIRING, ADJUSTING, AND CLEANING

A. Replace damaged and defective work.

B. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

C. Clean woodwork on exposed and semi-exposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

D. Clean according to manufacturer’s directions. Use no acids or harsh abrasives.

E. Leave surfaces clean and without defects.

END OF SECTION

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SECTION 06 64 00

PLASTIC PANELING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes glass-fiber reinforced plastic (FRP) paneling and trim accessories.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For plastic paneling and trim accessories.

1.3 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 450 or less.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact. Materials are to be factory packaged on strong pallets.

B. Store materials protected from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer. Store panels in a dry indoor location. Remove any foreign matter from face of panel by using a soft bristle brush, avoiding abrasive action.

1.5 WARRANTY

A. Manufacturer's Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace FRP panels that fail in materials or workmanship within specified warranty period.

1. Failures shall include, but not be limited to, substantial defects in material and workmanship, rotting, rusting, corrosion, development of structural surface cracks, or requiring painting or refinishing.
2. Warranty Period: 2 years from date of Substantial Completion.

B. Installer’s Warranty: Installer’s standard form in which installer agrees to repair or replace FRP panels that fail due to poor workmanship or faulty installation within specified warranty period.

1. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PLASTIC SHEET PANELING

A. Glass-Fiber-Reinforced Plastic Paneling: Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D 5319.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

a. Marlite.
b. Crane Composites, Inc.
c. Nudo Products, Inc.
d. Approved Equal.

2. Nominal Thickness: Not less than 0.075 inch plastic surface factory laminated on 5/8” gypsum board substrate.
3. Surface Finish: Smooth.
4. Color: See Room Finish Schedule.

2.2 ACCESSORIES

A. Trim Accessories: Manufacturer's standard one-piece vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.

1. Color: See Room Finish Schedule.

B. Adhesive: As recommended by plastic paneling manufacturer for the required substrates with a VOC content of 50 g/L or less.

C. Sealant: Single-component, mildew-resistant, neutral-curing silicone sealant recommended by plastic paneling manufacturer. Sealant shall have a VOC content of 250 g/L or less.

D. Mechanical Fasteners: Countersunk screws with fastener caps.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that could impair bond of adhesive, including oil, grease, dirt, and dust.

B. Condition panels by unpacking and placing in installation space no less than 24 hours before installation. Follow manufacturer's written recommendations if more condition time is required.

C. Lay out paneling before installing. Locate panel joints to provide equal panels at ends of walls not less than half the width of full panels so that trimmed panels at corners are not less than 12 inches wide.

3.2 INSTALLATION

A. Install plastic paneling according to manufacturer's written instructions.

B. Install panels in a full spread of adhesive with mechanical fasteners.

C. Install trim accessories with adhesive and nails. Do not fasten through panels.

D. Sealant:

1. Fill grooves in trim accessories with sealant before installing panels and bed inside corner trim in a bead of sealant.
2. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths.

E. Fill grooves in trim accessories with sealant before installing panels and bed inside corner trim in a bead of sealant.

F. Maintain uniform space between panels and wall fixtures. Fill space with sealant.

G. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

3.3 CLEANING AND PROTECTION

A. Remove temporary coverings and protection of adjacent work areas.

B. Repair or replace any installed products that have been damaged.

C. Clean installed panels in accordance with manufacturer’s instructions prior to Owner’s acceptance.

D. Remove and lawfully dispose of construction debris away from Project site.

E. Protect installed product and finish surfaces from damage during remainder of construction.

END OF SECTION

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SECTION 07 21 00

THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Glass-fiber blanket insulation.
2. Vapor barriers.
   Eave Ventilation Troughs.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product test reports.

1.3 QUALITY ASSURANCE

A. Retain ASTM test method below based on product and kind of fire-resistance characteristic specified for each product in Part 2. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84 for surface-burning characteristics, by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

B. Recycled Content: Provide glass-fiber insulation with recycled content so postconsumer recycled content plus one-half of preconsumer recycled content constitutes a minimum of 25 percent.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 GLASS-FIBER BLANKET INSULATION

A. Manufacturers:

1. CertainTeed Corporation.
2. Johns Manville.
3. Owens Corning.

B. Unfaced, Glass-Fiber Batt Insulation: ASTM C665, Type I (blankets without membrane facing): consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

C. Unfaced, Glass-Fiber Sound Attenuation Batt Insulation: ASTM C 665, Type 1, with maximum flame spread and smoke developed indexes of 10, when tested in accordance with ASTM E 84, passing ASTM E 136.

D. Foil-Faced, Glass-Fiber Blanket Insulation: ASTM C 665, Type III, Class B; consisting of fibers; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

2.3 VAPOR BARRIERS

A. Polyethylene Vapor Barriers: ASTM D 4397, 6 mils thick, with maximum permeance rating of 0.10 perm.

2.4 AUXILIARY INSULATING MATERIALS

A. Vapor-Barrier Tape: Pressure-sensitive tape of type recommended by insulation manufacturers for sealing joints and penetrations in vapor-retarder facings.

B. Vapor-Barrier Fasteners: Pancake-head, self-tapping steel drill screws; with fender washers.

C. Single-Component Nonsag Urethane Sealant: ASTM C 920, Type I, Grade NS, Class 25, Use NT related to exposure, and Use O related to vapor-barrier-related substrates.

D. Adhesive for Vapor Barriers: Product recommended by vapor-retarder manufacturer and with demonstrated capability to bond vapor barrriers securely to substrates indicated.

E. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.

F. Impaling pins: Impaling pins shall be self-adhering wire pins with sheet metal retaining clips and protective rubber tips. Adhesive for pins shall be as recommended by the pin manufacturer.

G. Joint Tape: Compatible for type of insulation board facing used.

H. Eave Ventilation Troughs: Polystyrene baffles designed and sized to fit between roof framing members and to provide cross ventilation between insulated attic spaces and vented eaves.

1. Manufacturers:
   a. Air Vent, Inc., a Gibraltar Industries Company.
   b. Or Approved Equal.

I. Acoustical Sealant: Provide sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24.

2.5 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate formed from perforated galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square, welded to projecting copper-coated steel spindle 0.105 inch in diameter and of length capable of holding insulation of thickness indicated securely in position with 1-1/2-inch square or diameter self-locking washers complying with the following requirements:

1. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch thick galvanized steel sheet, with beveled edge for increased stiffness.
2. Where anchors are located in attic spaces Insert location, protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap.

B. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed at any time to ice, rain, and snow.

C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Water-Piping Coordination: If water piping is located within insulated exterior walls, coordinate location of piping to ensure that it is placed on warm side of insulation and insulation encapsulates piping.

E. For preformed insulating units, provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.2 INSTALLATION OF GENERAL BUILDING INSULATION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Set vapor-barrier-faced units with vapor barrier to warm-in-winter side of construction, unless otherwise indicated.

1. Tape joints and ruptures in vapor barrier, and seal each continuous area of insulation to surrounding construction to ensure airtight installation.

C. Install mineral-fiber insulation in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch clearance of insulation around recessed lighting fixtures.
4. Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
5. For wood-framed construction, install mineral-fiber blankets according to ASTM C 1320 and as follows:

    a. With faced blankets having stapling flanges, secure insulation by inset, stapling flanges to sides of framing members.
    b. With faced blankets having stapling flanges, lap blanket flange over flange of adjacent blanket to maintain continuity of vapor barrier once finish material is installed over it.

3.3 INSTALLATION OF INSULATION FOR SOUND ATTENUATION

A. Install unfaced glass-fiber blanket insulation as shown on Drawings.

3.4 INSTALLATION OF VAPOR BARRIERS

A. General: Extend vapor barrier to extremities of areas to be protected from vapor transmission. Secure in place with adhesives or other anchorage system as indicated. Extend vapor barrier to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.

B. Seal vertical joints in vapor barriers over framing by lapping not less than two wall studs. Fasten vapor barriers to wood framing at top, end, and bottom edges; at perimeter of wall openings; and at lap joints. Space fasteners 16 inches o.c.

C. Before installing vapor barrier, apply urethane sealant to flanges of metal framing including runner tracks, metal studs, and framing around door and window openings. Seal overlapping joints in vapor barriers with vapor-barrier tape according to vapor-barrier manufacturer's written instructions. Seal butt joints with vapor-barrier tape. Locate all joints over framing members or other solid substrates.

D. Firmly attach vapor barriers to metal framing and solid substrates with vapor-barrier fasteners as recommended by vapor-barrier manufacturer.

E. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor barriers with vapor-barrier tape to create an airtight seal between penetrating objects and vapor barrier.

F. Repair tears or punctures in vapor barriers immediately before concealment by other work. Cover with vapor-barrier tape or another layer of vapor barrier.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following sheet metal flashing and trim:

1. Roof sheet metal fabrications.
2. Gutters.
3. Downspouts.
4. Splash blocks.
5. Snow guards.

1.2 PERFORMANCE REQUIREMENTS

A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.

1. Include details for forming, joining, supporting, and securing sheet metal flashing and trim, including pattern of seams, termination points, fixed points, expansion joints, expansion-joint covers, edge conditions, special conditions, and connections to adjoining work.

C. Samples for Initial Selection: For each exposed product and for each finish specified.

D. Samples for Verification: Samples of actual finish on 2” x 4” metal.

E. Maintenance data.

F. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

B. Preinstallation Conference: Conduct conference at Project site.

1.5 WARRANTY

A. Special Warranty on Finishes: Manufacturer’s standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that show evidence of deterioration of factory-applied finishes within 20 years from date of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.

B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.7 COORDINATION

A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leak proof, secure, and non-corrosive installation.

PART 2 - PRODUCTS

2.1 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

B. Aluminum Sheet: ASTM B 209, alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required.

1. As-Milled Finish: One-side bright mill finish.
2. Alclad Finish: Metallurgically bonded surfacing to both sides, forming a composite aluminum sheet with reflective luster.
3. Factory Prime Coating: Where painting after installation is indicated, pretreat with white or light-colored, factory-applied, baked-on epoxy primer coat; minimum dry film thickness of 0.2 mil.
4. Exposed Coil-Coated Finishes:

    a. Two-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat.

5. Colors:
   a. Gutters and downspouts: CMG Bone White.

2.2 UNDERLAYMENT MATERIALS

A. Felts: ASTM D 226, Type II (No. 30), asphalt-saturated organic felt, non-perforated.

B. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft.

C. Polyethylene Sheet: 6-mil-thick polyethylene sheet complying with ASTM D 4397.

2.3 SNOW GUARDS

A. Basis-of-Design: Subject to compliance with requirements, provide ColorGard unpunched cross member with compression fit clamps, manufactured by S-5! or approved equal.

B. Color: Match existing roof panels.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
   1. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory-applied coating.
   2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
   3. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
   4. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
   5. Fasteners for Zinc-Coated (Galvanized), Aluminum-Zinc Alloy-Coated Steel Sheet: Hot-dip galvanized steel according to ASTM A 153/A 153M or ASTM F 2329 or Series 300 stainless steel.
   6. Spikes and Ferrules: Same material as gutter, with spike with ferrule matching internal gutter width.

C. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, non-staining tape.

D. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

E. Epoxy Seam Sealer: Two-part, non-corrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

F. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type non-corrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

G. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.

1. Obtain field measurements for accurate fit before shop fabrication.
2. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.

B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

C. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.

D. Expansion Provisions: Where lapped or bayonet-type expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

E. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.

F. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, non-corrosive metal.

G. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.

2.6 ROOF DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters: 6” K style seamless, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from same material as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, gutter bead reinforcing bars, and gutter accessories from same metal as gutters.

B. Downspouts: Fabricate rectangular downspouts complete with mitered elbows. Furnish with metal hangers, from same material as downspouts, and anchors.

1. Fabricate from the following materials:

a. Aluminum: 0.024 inch.
b. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Roof-Edge Flashing and Fascia Cap: Fabricate in minimum 96-inch-long, but not exceeding 10-foot- long, sections. Furnish with 6-inch-wide, joint cover plates. Fabricate from the following materials:

1. Aluminum: 0.050 inch thick.
2. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

B. Copings: Fabricate in minimum 96-inch-long, but not exceeding 10-foot-long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, seal, and solder or weld watertight. Fabricate from the following materials:

1. Aluminum: 0.050 inch thick.
2. Aluminum-Zinc Alloy-Coated Steel: 0.040 inch thick.

C. Base Flashing: Fabricate from the following materials:

1. Aluminum: 0.040 inch thick.
2. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

D. Counterflashing and Flashing Receivers: Fabricate from the following materials:

1. Aluminum: 0.032 inch thick.
2. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

E. Roof-Penetration Flashing: Fabricate from the following materials:

1. Aluminum-Zinc Alloy-Coated Steel: 0.028 inch thick.

F. Roof-Drain Flashing: Fabricate from the following materials:

1. Stainless Steel: 0.016 inch thick.

2.8 WALL SHEET METAL FABRICATIONS

A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch-long, but not exceeding 12-foot-long, sections, under copings, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings. Form with 2-inch-high, end dams where flashing is discontinuous. Fabricate from the following materials:

1. Stainless Steel: 0.016 inch thick.

B. Opening Flashings in Frame Construction: Fabricate head, sill, jamb**,** and similar flashings to extend 4 inches beyond wall openings. Form head and sill flashing with 2-inch-high, end dams. Fabricate from the following materials:

1. Aluminum: 0.032 inch thick.
2. Aluminum-Zinc Alloy-Coated Steel: 0.022 inch thick.

2.7 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. 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 UNDERLAYMENT INSTALLATION

A. Polyethylene Sheet: Install polyethylene sheet with adhesive for anchorage. Apply in shingle fashion to shed water, with lapped and taped joints of not less than 2 inches.

B. Felt Underlayment: Install felt underlayment with adhesive for temporary anchorage. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches.

3.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

B. Metal Protection: Where dissimilar metals will contact each other or other corrosive substrates, and where metals will contact other materials such as treated lumber, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.
   1. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene underlayment.
   2. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.
   3. Coat back side of uncoated aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.

C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.

D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.

E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

1. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.

F. 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 watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

G. Seal joints with elastomeric sealant as required for watertight construction.

H. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets to be soldered to a width of 1-1/2 inches except where pre-tinned surface would show in finished Work.

1. Do not use open-flame torches for soldering. Heat surfaces to receive solder and flow solder into joints. Fill joints completely. Completely remove flux and spatter from exposed surfaces.

3.3 SNOW GUARD INSTALLATION

A. Follow manufacturer’s written instructions.

3.4 ROOF DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.

B. Hanging Gutters: Join sections with riveted and soldered joints or with lapped joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored gutter brackets spaced not more than 36 inches apart. Provide end enclosures and seal watertight with sealant. Slope to downspouts.

1. Install gutter with expansion joints at locations indicated, but not exceeding, 50 feet apart. Install expansion-joint caps.

C. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c. in between.

D. Conductor Heads: Anchor securely to wall with elevation of conductor head rim 1 inch below scupper discharge.

E. Splash blocks: Manufacturer’s standard precast concrete splash blocks. Obtain Architect’s approval of splash block design and size before proceeding with work.

3.5 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements**,** sheet metal manufacturer's written installation instructions**,** and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as

indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch centers.

C. Copings: Anchor to resist uplift and outward forces according to recommendations in SMACNA's "Architectural Sheet Metal Manual" and as indicated.

1. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 24-inch centers.
2. Anchor interior leg of coping with washers and screw fasteners through slotted holes at 24-inch centers.

D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending a minimum of 4 inches over base flashing. Install stainless-steel draw band and tighten.

E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with sealant.

F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.6 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

B. Through-Wall Flashing: Installation of through-wall flashing is specified in Division 4 Section "Unit Masonry Assemblies.

C. Opening Flashings in Frame Construction: Install continuous head, sill, jamb**,** and similar flashings to extend 4 inches beyond wall openings.

3.7 CLEANING AND PROTECTION

A. Clean and neutralize flux materials. Clean off excess solder and sealants.

B. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.

C. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:

1. Exterior joints in vertical surfaces and horizontal nontraffic surfaces.
2. Exterior joints in horizontal traffic surfaces.
3. Interior joints in vertical surfaces and horizontal nontraffic surfaces.
4. Interior joints in horizontal traffic surfaces.
5. Acoustical joint sealants.
6. Refer to Drawings and Joint Sealant Schedule at the end of this section for specific joint locations and sealant types.

1.2 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

B. Provide joint sealants for interior applications that establish and maintain airtight and water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.3 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for initial selection: For each type of sealant provide samples of full range of manufacturers available colors.

C. Samples: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch-wide joints formed between two 6-inch-long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Compatibility and Adhesion Test Reports: From sealant manufacturer for the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.

E. Product Test Reports: From a qualified testing agency indicating sealants comply with requirements, based on comprehensive testing of current production formulations.

F. Warranties: Special warranties listed in this Section.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An experienced Installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project site in original, unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials in compliance with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with installation or joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 deg F.
2. When joint substrates are wet.

B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

C. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.7 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance or other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint sealer manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance or other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Provide interior sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

1. Suitability for Immersion in Liquids: Where sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247. Liquid used for testing sealants is deionized water, unless otherwise indicated.

D. Stain-Test-Response Characteristics: Where sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

E. Suitability for Contact with Food: Where sealants are indicated for joints that will come in repeated contact with food, provides products that comply with 21 CFR 177.2600.

F. Color of Exposed Joint Sealants: Sealant, generally, shall be the color of the adjacent material which lies in the same plane as the sealant. Verify all colors with Architect prior to installation.

2.3 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be non-staining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

C. Suitability for Immersion in Liquids. Where elastomeric sealants are indicated for Use I for joints that will be continuously immersed in liquids, provide products that have undergone testing according to ASTM C 1247 and qualify for the length of exposure indicated by reference to ASTM C 920 for Class 1 or 2. Liquid used for testing sealants is deionized water, unless otherwise indicated.

D. Suitability for Contact with Food: Where elastomeric sealants are indicated for joints that will come in repeated contact with food; provide products that comply with 21 CFR 177.2600.

E. One part polyurethane, two parts polymer, or one part low-modulus silicone sealants at all exterior and interior joints, except horizontal traffic surfaces, in which case acceptable products are as follows:

1. Products:
    a. Sika “Sikaflex-1a”.
    b. Sonneborn “Sololastic NP I or NP II”.
    c. Tremco Manufacturing Company “Dymeric” or “Dymonic”.
    d. Pecora “Dynatrol II”.
    e. G.E. “Silpruf”.
    f. Dow Corning “790”.

2.4 SILICONE JOINT SEALANTS

A. Mildew-Resistant Silicone Joint Sealant: ASTM C 920.

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. BASF Building Systems.
    b. Dow Corning Corporation.
    c. GE Advanced Materials - Silicones.
    d. May National Associates, Inc.
    e. Pecora Corporation.
    f. Polymeric Systems, Inc.
    g. Schnee-Morehead, Inc.
    h. Sika Corporation; Construction Products Division.
    i. Tremco Incorporated.

2. Type: Single component.
3. Grade: nonsag.
4. Class: 100/50

2.5 URETHANE JOINT SEALANTS

A. Urethane Joint Sealant: ASTM C 920.

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. BASF Building Systems.
    b. Bostik, Inc.
    c. Lymtal, International, Inc.
    d. May National Associates, Inc.
    e. Pacific Polymers International, Inc.
    f. Pecora Corporation.
    g. Polymeric Systems, Inc.
    h. Schnee-Morehead, Inc.
    i. Sika Corporation; Construction Products Division.
    j. Tremco Incorporated.
2. Grade: Pourable.
3. Class: 50.
4. Uses Related to Exposure: Traffic.

2.6 LATEX JOINT SEALANTS

A. Latex Joint Sealant: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

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. BASF Building Systems.
    b. Bostik, Inc.
    c. May National Associates, Inc.
    d. Pecora Corporation.
    e. Schnee-Morehead, Inc.
    f. Tremco Incorporated.

2.7 ACOUSTICAL JOINT SEALANTS

A. Manufacturer’s standard nonsag, paintable, nonstaining latex sealant complying with ASTM C919. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E90.

B. Manufacturers: Subject to compliance with requirements, provide products manufactured by one of the following:

1. Specified Technologies, Inc; Smoke N Sound Acoustical Sealant.
2. Accumetric LLC; BOXX 824 Acoustical Sound Sealant.
3. Boss 824 Acoustical Sound Sealant.
4. Grabber Acoustical Sealant GSC.
5. Pecora Corporation.
6. USG Corporation.

C. Acoustical joint sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.8 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are non-staining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.9 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Non-staining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants.

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant.
    a. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.

2. Remove laitance and form-release agents from concrete.
    a. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

3. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION

A. General: Comply with manufacturer’s written instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

D. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

F. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

G. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

H. Installation of Preformed Silicone-Sealant System: Comply with manufacturer's written instructions.

I. Installation of Preformed Foam Sealants: Install each length of sealant immediately after removing protective wrapping, taking care not to pull or stretch material, producing seal continuity at ends, turns, and intersections of joints. For applications at low ambient temperatures where expansion of sealant requires acceleration to produce seal, apply heat to sealant in compliance with sealant manufacturer's written instructions.

J. Acoustical Sealant Installation: Comply with ASTM C919 and with manufacturer’s written recommendations.

K. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:

a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
b. Perform 1 test for each 1000 feetof joint length thereafter or 1 test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

B. Evaluation of Field-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

1. Joint Locations:
   a. Isolation and contraction joints in cast-in-place concrete slabs.
   b. Other joints as indicated.
2. Joint Sealant: Urethane.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

   a. Construction joints in cast-in-place concrete.
   b. Joints between plant-precast architectural concrete units.
   c. Control and expansion joints in unit masonry.
   d. Joints in exterior insulation and finish systems.
   e. Joints between metal panels where indicated.
   f. Joints between different materials listed above.
   g. Perimeter joints between materials listed above and frames of doors, windows and louvers.
   h. Control and expansion joints in ceilings, soffits and other overhead surfaces.
   i. Other joints as indicated.
2. Joint Sealant: Elastomeric.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

1. Joint Locations:

   a. Isolation joints in cast-in-place concrete slabs.
   b. Control and expansion joints in tile flooring.
   c. Other joints as indicated.

2. Joint Sealant: Urethane.
3. Joint Sealant Color: As selected by Architect from manufacturer’s full range of colors.

D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

    a. Control and expansion joints on exposed interior surfaces of exterior walls.
    b. Perimeter joints of exterior openings where indicated.
    c. Tile control and expansion joints.
    d. Vertical joints (non-fire-rated) on exposed surfaces of interior unit masonry and concrete walls and partitions.
    e. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
    f. Other joints as indicated.
2. Joint Sealant: Latex.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Sealant Location:

    a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
    b. Tile control and expansion joints where indicated.
    c. Other joints as indicated.

2. Joint Sealant: Silicone.
3. Joint Sealant Color: As selected by Architect from manufacturer's full range of colors.

F. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Sealant Location:

    a. Acoustical joints where indicated.

2. Joint Sealant: Acoustical.
3. Joint Sealant Color: As selected by Architect from manufacturer's full range of colors.

3.6 CLEANING

A. Remove masking tape.

B. Clean adjacent surfaces soiled by sealant installation.

3.7 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired joint sealants are indistinguishable from the original work.

END OF SECTION

SECTION 08 14 16

FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Solid-core flush wood doors with wood veneer.
2. Factory finishing flush wood doors.
3. Factory machining for hardware.

B. Related Sections include the following:

1. Division 8 Section “Door Hardware” for door hardware for wood doors.

1.2 SUBMITTALS

A. Product Data: For each type of door. Include details of core and edge construction, louvers, and trim for openings. Include factory-finishing specifications.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each kind of door; construction details not covered in Product Data; location and extent of hardware blocking; and other pertinent data, and the following:

1. Indicate dimensions and locations of mortises and holes for hardware.
2. Indicate dimensions and locations of cutouts.
3. Requirements for veneer matching at doors with hardwood veneer.
4. Doors to be factory finished and finish requirements.
5. Fire-protection ratings for fire-rated doors.

C. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide three samples showing typical range of color and grain to be expected in the finished work.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in cardboard cartons and wrap bundles of doors in plastic sheeting.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.4 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace doors that are defective in materials or workmanship, have warped (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section, or show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.

1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors.
2. Warranty shall be in effect during the following period of time from date of Substantial Completion:

a. Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Jeld-Wen Windows and Doors.
2. Kolbe Windows and Doors.
3. Algoma Hardwoods Inc.
4. Mohawk Flush Doors, Inc.
5. Approved Equal.

2.2 DOOR CONSTRUCTION, GENERAL

A. For Transparent Finish - Hardwood Veneer: AWI custom quality wood, plain sliced with book matched hardwood veneer for transparent finish:
1. Wood: Maple or Oak.

B. Interior Solid-Core Doors:

1. Grade: Custom.
2. Faces: Any closed-grain hardwood of mill option.
3. Core: Either glued wood stave or structural composite lumber.
4. Construction: Five plies. Stiles and rails are bonded to core, then entire unit is abrasive planed before veneering.

C. Mineral-Core Doors:

1. Core: Noncombustible mineral product complying with requirements of referenced quality standard and testing and inspecting agency for fire-protection rating indicated.
2. Blocking: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated as needed to eliminate through-bolting hardware.
3. Edge Construction: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

2.3 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels, unless otherwise indicated:

1. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements in NFPA 80 for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame Shop Drawings, DHI A115-W series standards, and hardware templates.

1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.

C. Provide doors with sufficient undercut to allow clearance above finish floors

1. Where schedule floor finish material is less than 1/2” thick, allow not more than 5/8” above top of substrate to which it is applied.
2. Where schedule floor finish material is more than 1/2” thick, allow not more than 1/4” above finish material.
3. Allow not more than 1/4” above threshold where applicable.

2.4 FACTORY FINISHING

A. General: Comply with referenced quality standard for factory finishing. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.

1. Finish faces, all four edges, edges of cutouts, and mortises. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.

B. Finish doors at factory that are indicated to receive transparent finish.

C. Transparent Finish:

1. Grade: Premium.
2. Finish: Interior polyurethane-based clear satin varnish.

3. Staining: As selected by Architect from manufacturer's full range; VOC content not more than 250 g/L.
4. Effect: Semi-filled finish.
5. Sheen: Satin.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames before hanging doors.

1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation see Division 08 "Door Hardware."

B. Manufacturer's Written Instructions: Install doors to comply with manufacturer's written instructions, referenced quality standard, and as indicated.

C. Factory-Finished Doors and Frames: Restore finish before installation if fitting or machining is required at Project site.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes hardware for new and existing doors.
   1. On temporary doors, remove hardware for reuse, see Door Schedule.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For each exposed finish.

C. Other Action Submittals:

   1. Door Hardware Sets: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as procedures and diagrams.

      a. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
      b. Content: Include the following information:

         1) Identification number, location, hand, fire rating and material of each door and frame.
         2) Type, style, function, size, quantity, and finish of each door hardware item. Include description and function of each lockset and exit device.
         3) Complete designations of every item required for each door or opening including name and manufacturer.

   2. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by lock manufacturer.

   1. Installer's responsibilities include supplying and installing door hardware and providing a qualified Architectural Hardware Consultant available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.

B. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252.

1. Test Pressure: After 5 minutes into the test, neutral pressure level in furnace shall be established at 40 inchesor less above the sill.

D. Hardware shall be in strict accord with the applicable provisions of the ADA-ABA Accessibility Guidelines; the International Building Code, Chapter 11 Accessibility; the Wisconsin Administrative Code, Chapter Comm 62, and local codes.

E. Key Conference: Conduct conference at Project site. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.

1.6 COORDINATION

A. Templates: Distribute door hardware templates for doors, frames, and other work specified to be factory prepared for installing door hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

1. Warranty Period: Three years from date of Substantial Completion, except as follows:
   a. Exit Devices: Two years from date of Substantial Completion.
   c. Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in this Section and door hardware sets indicated in door and frame schedule.

B. Designations: Products are identified by using door hardware designations, as follows:

1. Named Manufacturer's Products: Manufacturer and product designation are listed for each door hardware type required for the purpose of establishing minimum requirements.
2. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality, and function.

C. Finishes:

1. Satin chrome (626/US26B).
2. Closers: Satin chrome (626/US26B).
3. Other Hardware: Matching finish of lockset/latchset.

4. Verify all hardware finishes with Owner prior to ordering.

2.2 HINGES, GENERAL

A. Template requirements: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.

B. Hinge Base Metal: Unless otherwise indicated, provide the following:

1. Interior Hinges: Steel, with steel pin.
2. Hinges for Fire-Rated Assemblies: Steel, with steel pin.

C. Non-removable Pins: Provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for outswinging exterior doors and outswinging corridor doors with locks.

D. Fasteners: Comply with the following:

1. Machine Screws: For metal doors and frames. Install into drilled and tapped holes.
2. Wood Screws: For wood doors.
3. Threaded-to-the-Head Wood Screws: For fire-rated wood doors.
4. Screws: Phillips flat-head; machine screws (drilled and tapped holes) for metal doors, wood screws for wood doors. Finish screw heads to match surface of hinges.

2.3 HINGES

A. Butts and Hinges: BHMA A156.1.

B. Template Hinge Dimensions: BHMA A156.7.

C. Manufacturers:

1. Hager Companies (HAG).
2. Stanley Commercial Hardware; Div. of The Stanley Works (STH).
3. Or approved equal.

D. Hinges:

1. Spring loaded hinges to meet ANSI K81071F; two (2) minimum at Entry Doors only.
2. Provide one (1) pair hinges on 1-3/4" H.C. doors and one and one-half (1-1/2) pair hinges on all other doors.
3. Hinges to match lockset finish.
4. Outswing doors shall have non-rising pins.
5. Where hinges are required to swing 180 degrees, furnish hinges of sufficient throw to clear the trim.

2.4 LOCKS AND LATCHES, GENERAL

A. Accessibility Requirements: Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.

B. Latches and Locks for Means of Egress Doors: Comply with NFPA 101. Latches shall not require more than 15 lbf to release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.

C. Lock Throw: Comply with testing requirements for length of bolts required for fire labeled fire doors.

E. Backset: 2-3/4 inches unless otherwise indicated.

F. Strikes: Manufacturer's standard strike with strike box for each latch bolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set.

G. Lever sets throughout.

2.5 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: Function numbers and descriptions indicated in door hardware sets comply with the following:

1. Bored Locks: BHMA A156.2.
2. Interconnected Locks: BHMA A156.12.

B. Bored Locks: BHMA A156.2, Grade 1; Series 4000.

1. Manufacturers: Schlage Commercial Lock Division; an Ingersoll-Rand Company (SCH).
2. Approved Equal.

2.6 EXIT DEVICES

A. Exit Devices: BHMA A156.3, Grade 1.

B. Accessibility Requirements: Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf.

C. Exit Devices for Means of Egress Doors: Comply with NFPA 101. Exit devices shall not require more than 15 lbfto release the latch. Locks shall not require use of a key, tool, or special knowledge for operation.

D. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing according to UL 305.

E. Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing according to UL 305 and NFPA 252.

F. Outside Trim: Lever with cylinder; material and finish to match locksets, unless otherwise indicated.

1. Match design for locksets and latchsets, unless otherwise indicated.

G. Through Bolts: For exit devices and trim fire-rated wood doors.

H. Manufacturers:

1. SARGENT Manufacturing Company; an ASSA ABLOY Group company (SGT).
2. Von Duprin; an Ingersoll-Rand Company (VON).
3. Dor-O-Matic; an Ingersoll-Rand Company (DOR).
4. Yale Commercial Locks and Hardware; an ASSA ABLOY Group company (YAL).

2.8 LOCK CYLINDERS

A. Standard Lock Cylinders: BHMA A156.5, Grade 1.

B. Cylinders: Manufacturer's standard tumbler type, constructed from brass or bronze, stainless steel, or nickel silver, and complying with the following:

1. Number of Pins: Six.

Permanent Cores: Manufacturer's standard; finish face to match lockset; with interchangeable cores.

D. Construction Keying: Comply with the following:

1. Construction Master Keys: Provide cylinders with feature that permits voiding of construction keys without cylinder removal. Provide 4 construction master keys.
2. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

a. Furnish permanent cores to Owner for installation.

E. Manufacturer: Same manufacturer as for locks and latches.

2.9 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A.
System to be approved by Owner.

2.10 CLOSERS

A. Accessibility Requirements: Comply with the following maximum opening-force requirements:

1. Interior, Non-Fire-Rated Hinged Doors: 5 lbf applied perpendicular to door.
2. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

B. Door Closers for Means of Egress Doors: Comply with NFPA 101. Door closers shall not require more than 30 lbf to set door in motion and not more than 15 lbf to open door to minimum required width.

C. Emergency-Exit Door Requirements: Comply with requirements of authorities having jurisdiction for automatic entrance doors serving as a required means of egress.

D. Size of Units: Unless otherwise indicated, comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

E. Surface Closers: BHMA A156.4, Grade 1. Provide type of arm required for closer to be located on non-public side of door, unless otherwise indicated.

1. Manufacturers:

a. Arrow USA; an ASSA ABLOY Group company (ARW).
b. Norton Door Controls; an ASSA ABLOY Group company (NDC).
c. Or approved equal.

2.11 STOPS AND HOLDERS

A. Stops and Bumpers: BHMA A156.16, Grade 1.

1. Provide floor stops for doors unless wall or other type stops are scheduled or indicated. Do not mount floor stops where they will impede traffic. Where floor or wall stops are not appropriate, provide overhead holders.

B. Mechanical Door Holders: BHMA A156.16, Grade 1.

C. Wall Stops and Holders: BHMA A156.8, Grade 1.

D. Combination Floor and Wall Stops and Holders: BHMA A156.8, Grade 1.

E. Combination Overhead Stops and Holders: BHMA A156.8, Grade 1.

F. Silencers for Door Frames: BHMA A156.16, Grade 1; neoprene or rubber; fabricated for drilled-in application to frame.

G. Manufacturers:
1. Glynn-Johnson; an Ingersoll-Rand Company (GJ).
2. Hager Companies (HAG).
3. IVES Hardware; an Ingersoll-Rand Company (IVS).
4. Or approved equal.

2.12 DOOR GASKETING

A. Standard: BHMA A156.22.

B. General: Provide continuous weather-strip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated or scheduled. Provide non-corrosive fasteners for exterior applications and elsewhere as indicated.

1. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
2. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
3. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

C. Smoke-Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke-control ratings indicated, based on testing according to UL 1784.

1. Provide smoke-labeled gasketing on 20-minute-rated doors and on smoke-labeled doors.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated, based on testing according to ASTM E 1408.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Gasketing Materials: ASTM D 2000 and AAMA 701/702.

G. Manufacturers:

1. Hager Companies (HAG).
2. M-D Building Products, Inc. (MD).
3. National Guard Products (NGP).
4. Pemko Manufacturing Co. (PEM).
5. Reese Enterprises (RE).
6. Sealeze; a unit of Jason Incorporated (SEL).
7. Zero International (ZRO).
8. Or approved equal.

2.13 THRESHOLDS

A. Standard: BHMA A156.21.

B. Accessibility Requirements: Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch high.

C. Thresholds for Means of Egress Doors: Comply with NFPA 101. Maximum 1/2 inch high.

D. Location: At exterior doors.

1. Types: Guide Specification – Hager (HAG).

a. Threshold: 410 S. Verify width required.

E. Manufacturers:

1. National Guard Products (NGP).
2. Pemko Manufacturing Co. (PEM).
3. Hager Companies (HAG).
4. Reese Enterprises (RE).
5. Zero International (ZRO).
6. Or approved equal.

2.14 MISCELLANEOUS DOOR HARDWARE

A. Auxiliary Hardware: BHMA A156.16, Grade 1.

1. Manufacturers:

a. Baldwin Hardware Corporation (BH).
b. Cal-Royal Products, Inc. (CRP).
c. Don-Jo Mfg., Inc. (DJO).
d. Hager Companies (HAG).
e. Lawrence Brothers, Inc. (LB).
f. Rockwood Manufacturing Company (RM).
g. Stanley Commercial Hardware (STH).
h. Trimco (TBM).

C. Accessories

1. Furnish all necessary hardware accessories such as wood or machine screws, bolts, nuts, anchors, toggle bolts, and other fasteners, each of the type, size, material and finish for its intended purpose and each according to the material to which the hardware is being applied.

2. Keying system will be determined by Owner.

2.15 FABRICATION

A. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.

B. Fasteners: Provide screws according to commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

1. Comply with NFPA 80 for fasteners of door hardware in fire-rated applications.

C. Finishes: BHMA A156.18, as indicated in Door Hardware Sets.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Steel Doors and Frames: Comply with DHI A115 Series. Drill and tap doors and frames for surface-applied door hardware according to ANSI A250.6.

B. Wood Doors: Comply with DHI A115-W Series.

C. Mounting Heights: Mount door hardware units at heights indicated as follows unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. Custom Steel Doors and Frames: DHI's "Recommended Locations for Builders' Hardware for Custom Steel Doors and Frames."
3. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

D. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

E. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

F. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant.

G. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

1. Spring Hinges: Adjust to achieve positive latching when door is allowed to close freely from an open position of 30 degrees.
2. Door Closers: Unless otherwise required by authorities having jurisdiction, adjust sweep period so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the leading edge of the door.

I. Installation:

1. Install hardware in accordance with manufacturer’s recommendations and instructions.

2. Install hardware on UL labeled openings in accordance with manufacturer's requirements to maintain the fire rating.
3. Install closers on the room side of corridor doors, stair side of stairways, and interior side of exterior doors.

3.2 FIELD QUALITY CONTROL

A. Hardware shall be in strict accord with the applicable provisions of the ADA-ABA Accessibility Guidelines; the International Building Code, Chapter 11 Accessibility; and the Wisconsin Administrative Code, Chapter Comm 62.

B. Furnish UL listed hardware for all UL labeled openings in conformance with requirements for the class of opening scheduled.

3.3 DOOR HARDWARE SETS:

NEW DOORS

SET 01
Door 101

1	EA	STOREROOM LOCK	AL80PD JUP	626	SCH
1	EA	WALL BUMPER	409	626	RO
3	EA	HINGES	5BB1 4.5" X 4.5"	626	IVE

SET 02
Doors 102 & 103

1	EA	PRIVACY LOCK	AL50PD JUP	626	SCH
1	EA	SURFACE CLOSER	4150	626	LCN
1	EA	WALL BUMPER	409	626	RO
3	EA	HINGES	5BB1 4.5" X 4.5"	626	IVE

SET 03
Door 104

1	EA	PASSAGE LOCK	AL10S JUP	626	SCH
1	EA	WALL BUMPER	409	626	RO
3	EA	HINGES	5BB1 4.5" X 4.5"	626	IVE

END OF SECTION

SECTION 08 83 00

MIRRORS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Annealed monolithic glass mirrors with stainless steel channel frame.

1.2 SUBMITTALS

A. Product Data: For mirrors and mounting hardware.

B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachments to other work.

C. Product Certificates: For each type of mirror, signed by product manufacturer.

1.3 QUALITY ASSURANCE

A. Glazing Publications: Comply with GANA's "Glazing Manual" and GANA Mirror Division's "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors" unless more stringent requirements are indicated

B. Safety Glazing Products: For tempered mirrors, provide products complying with testing requirements in 16 CFR 1201 for Category II materials.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors, protected from moisture including condensation.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form, made out to Owner and signed by mirror manufacturer agreeing to replace mirrors that deteriorate, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated in second subparagraph below.

1. Deterioration of Mirrors: Defects developed from normal use that are attributable to the manufacturing process and not to causes other than glass breakage and practices for

maintaining and cleaning mirrors contrary to mirror manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.

2. Warranty Period: Fifteen (15) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide stainless steel channel frame mirror by one of the following:
   1. Bobrick.
   2. Vicon.
   3. Approved Equal.

2.2 MIRROR FRAME:

A. Type 430 stainless steel, 1/2” x 1/2” x 3/8” channel with 1/4” return at rear.

B. All exposed surfaces shall have bright polished finish.

C. One piece frame with 90 degree mitered corners.

D. Galvanized steel back with integral horizontal hanging brackets near the top for hanging the mirror and near the bottom to prevent the bottom of mirror from pulling away from the wall.

E. Locking devices to secure mirror to concealed wall hanger.

F. In Screw Locking Design, concealed Philips-head locking screws to securely fasten mirror to wall hanger.

2.3 MIRROR

A. No. 1 quality, 1/4” select float glass.

   1. Selected for silvering.
   2. Electrolytically copper-plated by the galvanic process.
   3. Guaranteed for 15 years against silver spoilage.

B. Corners protected by friction-absorbing filler strips.

C. Back protected by full-size, shock-absorbing, water-resistant, nonabrasive, 3/16” thick polyethylene padding.

2.4 CONCEALED WALL HANGER

A. 20-gauge galvanized steel, incorporating lower support member, forming rigid rectangle, which engages lower backplate louvers to keep bottom of mirror against the wall.

2.5 MISCELLANEOUS MATERIALS

A. Setting Blocks: Elastomeric material with a Type A Shore durometer hardness of 85, plus or minus 5.

B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.

2.6 MIRROR HARDWARE

A. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

B. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

2.7 FABRICATION

A. Mirror Edge Treatment:

1. Seal edges of mirrors after edge treatment to prevent chemical or atmospheric penetration of glass coating.
2. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.

B. Provide a minimum air space of 1/8 inch between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.

C. Mount wall hanger on wall with screws at points indicated. For plaster or drywall construction, provide backing to comply with local building codes, then secure wall hanger with screws.

D. When providing a concealed backing, allow backing to cover minimum range of mounting hole locations per manufacturer's written instructions.

E. For other wall surfaces, provide fiber plugs or expansion shields for use with screws, or provide 1/8" toggle bolts or expansion bolts.

F. Hang mirror on wall hanger with all four backplate louvers engaged behind horizontal wall hanger members.

G. Snap Locking Design: Locking devices automatically secure mirror to concealed wall hanger when it is lowered into final position.

H. Screw Locking Design: Lock mirror to wall hanger by tightening Phillips-head locking screws that are concealed in the bottom of frame at points indicated per manufacturer's written instructions.

I. Protect mirrors from breakage and contaminating substances resulting from construction operations.

J. Do not permit edges of mirrors to be exposed to standing water.

K. Maintain environmental conditions that will prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.

3.2 CLEANING

A. Remove wet glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean mirrors and adjacent surfaces.

END OF SECTION

SECTION 09 29 00

GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Interior gypsum board.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For the following products:

1. Trim Accessories: Full-size Sample in 12-inch long length for each trim accessory indicated.
2. Textured Finishes: Manufacturer's standard size for each textured finish indicated and on the same backing indicated for Work.

1.3 QUALITY ASSURANCE

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

B. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.

C. Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.

D. Mockups: Before beginning gypsum board installation, install mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Install mockups for the following:

a. Each level of gypsum board finish indicated for use in exposed locations.
b. Each texture finish indicated.

2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
3. Simulate finished lighting conditions for review of mockups.

4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 INTERIOR GYPSUM BOARD

A. General: Complying with ASTM C 36/C 36M or ASTM C 1396/C 1396M, as applicable to type of gypsum board indicated and whichever is more stringent.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Temple-Inland.
b. American Gypsum Co.
c. G-P Gypsum.
d. Lafarge North America Inc.
e. National Gypsum Company.
f. USG Corporation.

B. Type X:

1. Thickness: 5/8 inch.
2. Long Edges: Tapered.

2.2 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Wallboard: Paper.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.

a. Use setting-type compound for installing paper-faced metal trim accessories.

3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.
5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.

2.3 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet, or rolled zinc.
2. Shapes:

    a. Cornerbead.
    b. Bullnose bead.
    c. LC-Bead: J-shaped; exposed long flange receives joint compound.
    d. U-Bead: J-shaped; exposed short flange does not receive joints compound.
    e. Expansion (control) joint.

B. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Fry Reglet Corp.
    b. Gordon, Inc.
    c. Pittcon Industries.

2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B221, Alloy 6063-T5.
3. Finish: Corrosion-resistant primer compatible with joint compound and finish materials.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

1. Use adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

2.5 TEXTURE FINISHES

A. Primer: As recommended by textured finish manufacturer.

B. Aggregate Finish: Water-based, job-mixed, aggregated, drying-type texture finish for spray application.

1. Products: Subject to compliance with requirements, provide one of the following:

    a. G-P Gypsum; Georgia-Pacific Ceiling Textures/Vermiculite.
    b. USG Corporation; SHEETROCK Wall and Ceiling Spray Texture (Aggregated).

2. Texture: Light Orange Peel.

PART 3 - EXECUTION

3.1 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Type X: Where required for fire-resistance-rated assembly, and as indicated on Drawings.

3.2 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C 840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.
2. Bullnose Bead: Use at outside corners.
3. LC-Bead: Use where indicated.
4. U-Bead: Use where indicated.

3.3 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 4: At panel surfaces that will be exposed to view and under wall coverings, unless otherwise indicated.

a. Primer and its application to surfaces are specified in Division 9, Section “Interior Painting.”

3.4 APPLYING TEXTURE FINISHES

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.

B. Texture Finish Application: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.

C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written recommendations.

3.5 PROTECTION

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, or mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

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SECTION 09 64 00

WOOD FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes patching, cleaning, and finishing previously installed wood flooring.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 FIELD FINISHING

A. Polyurethane Finish System: Complete solvent-based, oil-modified system of compatible components that is recommended by finish manufacturer for application indicated.

1. Floor Sealer: Pliable, penetrating type.
2. Finish Coats: Formulated for multi-coat application on wood flooring.

B. Wood Filler: Compatible with finish system components.

PART 3 - EXECUTION

3.1 FIELD FINISHING

A. Machine-sand flooring to remove offsets, ridges, cups, and sanding-machine marks that would be noticeable after finishing. Vacuum and tack with a clean cloth immediately before applying finish.

1. Comply with applicable recommendations in NWFA's "Installation Guidelines: Wood Flooring.".

B. Fill and repair wood flooring seams and defects.

C. Apply floor-finish materials in number of coats recommended by finish manufacturer for application indicated, but not less than one coat of floor sealer and three finish coats.

1. Apply stains to achieve an even color distribution.

2. For water-based finishes, use finishing methods recommended by finish manufacturer to minimize grain raise.

D. Cover wood flooring before finishing.

E. Do not cover wood flooring after finishing until finish reaches full cure, and not before seven days after applying last finish coat.

3.2 PROTECTION

A. Protect installed wood flooring during remainder of construction period with covering of heavy kraft paper or other suitable material. Do not use plastic sheet or film that might cause condensation.

END OF SECTION

SECTION 09 65 13

RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Wall base.
2. Molding accessories.

B. Related Sections include:

1. Division 04, Section “Unit Masonry” for stone wall base.

1.2 SUBMITTALS

A. Product Data: For each product indicated.

B. Samples: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches long, of each resilient product color, texture, and pattern required.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

1.4 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer in spaces to receive resilient products.

B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer.

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Johnsonite

2. Flexco.
3. Armstsrong.
4. Approved Equal.

2.2 RESILIENT WALL BASE

A. Wall Base Standard: ASTM F 1861.

1. Material Requirement: Type TV (vinyl, thermoplastic).
2. Manufacturing Method: Group I (solid, homogeneous).
3. Flexibility: Will not crack, break, or show any signs of fatigue when bent around a 1/4 inch diameter cylinder.
4. Style: Cove (base with toe).
5. Meets or exceeds the performance requirements for resistance to heat/light aging, chemicals, and dimensional stability when tested to the methods described in ASTM F 1861.

B. Minimum Thickness: 0.080 inch.

C. Height: 4 inches.

D. Lengths: Coils in manufacturer's standard lengths.

E. Outside Corners: Job formed.

F. Inside Corners: Job formed.

G. Locations: See Drawings.

H. Finish: See Room Finish Schedule.

I. Colors and Patterns: See Room Finish Schedule.

2.3 RESILIENT MOLDING ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following manufacturers:

1. Johnsonite
2. Flexco.
3. Armstsrong.
4. Approved Equal.

B. Material: Vinyl.

C. Colors: See Room Finish Schedule.

2.5 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, Portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of resilient products.

B. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

D. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

1. Do not install resilient products until they are the same temperature as the space where they are to be installed.

E. Areas to receive resilient products shall be clean, fully enclosed, weather tight, and maintained at a uniform temperature of at least 65°F for 24 hours immediately before installation.

F. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 RESILIENT BASE INSTALLATION

A. Comply with manufacturer’s written instructions for installing resilient base.

B. Installation work should not begin until the work of all other trades, especially overhead trades, has been completed.

C. Areas to receive wall base shall be maintained at a uniform temperature of at least 65°F for 24 hours during and for 24 hours after the installation is completed.

D. The wall base and adhesives shall be conditioned in the same manner.

E. Floors and walls shall be clean, dry, free of dust, all paints, wallpaper, and all other foreign materials which may affect proper adhesive bonding.

F. Wall bases shall not be installed on surfaces that will be exposed to drastic temperature changes or moisture.

G. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

H. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

I. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

J. Do not stretch wall base during installation.

K. Vinyl Wall Base: Coiled wall base shall be uncoiled and lay flat for at least 24 hours at 65°F prior to installation.

L. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
2. Inside Corners: Use straight pieces of maximum lengths possible. Form by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.

3.3 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor coverings that would otherwise be exposed.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

    a. Do not wash surfaces until after time period recommended by manufacturer.

B. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.

END OF SECTION

SECTION 09 91 23

INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Priming and painting gypsum board.

2. Wood finishes for wood trim.

B. Related Sections Include:

1. Division 06, Section “Interior Architectural Woodwork”.

C. “Paint” as used herein means all coating systems materials including primers, emulsions, enamels, stains, sealers and fillers and other applied material whether used as prime, intermediate or finish coats.

D. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

1.2 DEFINITIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
3. Semi-gloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.3 SUBMITTALS

A. Samples for Verification: For each color and material to be applied, with texture to simulate actual conditions, on representative Samples of the actual substrate.

1. Submit 2 Samples on the following substrates for Architect's review of color and texture only:

a. Painted Gypsum Board: 6 inch square for each color with sheen, color and texture achieved.

b. Stained Wood: 4 inch by 6 inch samples of natural- or stained-wood finish on representative surfaces.

1.4 QUALITY ASSURANCE

A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in “MPI Approved Products List.”
2. Preparation and Workmanship: Comply with requirements in “MPI Architectural Painting Specification Manual” for products and paint systems indicated.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver materials to site until having received all written approvals of submitted information and samples.

B. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:

1. Product name or title of material.
2. Product description (generic classification or binder type).
3. Manufacturer's stock number and date of manufacture.
4. Contents by volume, for pigment and vehicle constituents.
5. Thinning instructions.
6. Application instructions.
7. Color name and number.
8. VOC content.

C. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain storage containers in a clean condition, free of foreign materials and residue.

1. Keep storage area neat and orderly. Remove oily rags and waste daily.

D. Take all precautions to insure that workers and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and applications of paint.

1.6 PROJECT CONDITIONS

A. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F.

B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F.

C. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

D. Do not apply paint to surfaces in hot sunlight.

1.7 SEQUENCING AND SCHEDULING

A. Schedule cleaning and painting so that contaminants from cleaning process will not fall onto newly-painted surfaces.

1.8 EXTRA MATERIALS

A. Furnish an additional 5 percent, but not less than one (1) gallon of each type/color of paint applied.

B. All containers shall be sealed for storage and identified with appropriate labels.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with requirements, provide products by one of the following:

1. Sherwin-Williams Company.
2. Benjamin Moore & Co.
3. Diamond Vogel.
4. Hallman Lindsay
5. ICI Dulux Paint Centers (ICI Dulux Paints).
6. Mautz.
7. PPG Industries, Inc. (Pittsburgh Paints).
8. Kelley-Moore Paints.

2.2 PAINT MATERIALS, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable. Use products with low V.O.C. content when available.

C. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when

calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

1. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
2. Nonflat Paints, Coatings and Primers: VOC content of not more than 150 g/L.
3. Nonflat Topcoat Paints: VOC content of not more than 150 g/L.
4. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.

2.3 INTERIOR PAINTS

A. Latex; MPI INT 9.2M.

B. VOC Content: E Range of E1.

2.4 EQUIPMENT

A. Provide all brushes, rollers, ladders, scaffolding and other equipment of any kind to properly execute each type of work.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application.

1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.

B. Maximum Moisture Content of Substrates:

1. Gypsum Board: 12 percent.
2. Wood: 15 percent.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

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.

1. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.

3.2 PREPARATION

A. General: 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 size or weight of the item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

B. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."

C. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.

1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

D. Gypsum Board: Fill minor irregularities with patching material and sand to smooth level surfaces taking care not to raise nap of paper.

E. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.

1. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.

F. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
2. 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.
3. Use only thinners approved by paint manufacturer and only within recommended limits.

G. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.

2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
3. Provide finish coats that are compatible with primers used.
4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

B. Provide adequate forced ventilation of enclosed areas for curing of installed materials, to disperse humidity and to prevent hazardous accumulations of dust, fumes, vapors or gases.

C. Do work under adequate illumination and dust-free conditions.

1. Apply paint by brush, roller or spray methods except where particular method will produce unsatisfactory results. Where spray method is used on concrete block, follow with roller to work paint into voids.

D. Materials.

1. Do not open containers until required for use.
2. Stir materials thoroughly and keep at uniform consistency during application.

E. Scheduling Painting: 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.

1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
2. Omit primer over metal surfaces that have been shop primed and touchup painted.
3. 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.
4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

F. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.
3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.

G. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.

H. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by 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.

I. 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 all final coats.

J. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 CLEANING

A. During the progress of this work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each work day.

B. Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

3.5 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.6 INTERIOR PAINT SCHEDULE

A. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces:

1. Institutional Low-Odor/VOC Latex System: MPI INT 9.2M.
   a. Prime Coat: Interior latex primer/sealer.
   b. Intermediate Coat: Institutional low-odor/VOC interior latex matching topcoat.
   c. Topcoat: Institutional low-odor/VOC interior latex.
      i. Walls: Eggshell Finish
   d. Colors: See Room Finish Schedule. Verify selections with Owner.

3.7 STAIN AND NATURAL-FINISH WOODWORK SCHEDULE

A. Stained Woodwork: Provide the following stained finished over new interior trim and base woodwork:

1. Waterborne Clear Acrylic Over Stain Systems: MPI INT 6.3W. Two finish coats of waterborne clear acrylic varnish over a sealer coat and interior wood stain. Wipe wood filler before applying stain.
   a. Filler Coat: Open-grain wood filler.
   b. Stain Coat: Interior wood stain (semitransparent).
   c. Color: See Room Finish Schedule.
   d. Sealer Coat: Clear sanding sealer.
   e. Finish Coats: Interior polyurethane-based clear satin varnish.

END OF SECTION

SECTION 10 21 13

TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:

1. Steel toilet compartments configured as toilet enclosures and urinal screens.

B. Related Sections include the following:

1. Division 6 Section “Rough Carpentry" for blocking.
2. Division 10 "Toilet and Bath Accessories" for toilet tissue dispensers, grab bars, soap dispensers, and similar accessories.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Show locations of cutouts for compartment-mounted toilet accessories.

C. Samples for Initial Selection: For each type of unit indicated.

1.3 QUALITY ASSURANCE

A. Comply with requirements in CID-A-A-60003, "Partitions, Toilets, Complete."

B. Surface Burning Characteristics: As determined by testing identical products according to ASTM E 84, or another standard acceptable to authorities having jurisdiction, by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

C. Comply with applicable provisions in the U. S. Architectural & Transportation Barriers Compliance Board’s “Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities,” ICC/ANSI A117.1, and all applicable state and local accessibility requirements for toilet compartments designated as accessible.

1.4 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication and indicate measurements on Shop Drawings.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating toilet compartments without field measurements. Coordinate wall, floor, ceilings, and other contiguous construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Steel Sheet: Commercial steel sheet for exposed applications; mill phosphatized and selected for smoothness.

1. Electrolytically Zinc Coated: ASTM A 879/A 879M, 01Z (03G).
2. Hot-Dip Galvanized: ASTM A 653/A 653 M, either hot-dip galvanized or galvannealed.

2.2 STEEL UNITS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Accurate Partitions Corporation.
2. All American Metal Corporation.
3. American Sanitary Partition Corporation.
4. Bradley Corporation.
5. Flush Metal Partition Corp.
6. General Partitions Manufacturing Corp.
7. Approved Equal.

B. Toilet Enclosure Style: Floor anchored and overhead braced.

C. Urinal-Screen Style: Wall hung.

D. Doors, Panels, Urinal Screens, and Pilaster Construction: Seamless, metal facing sheets pressure laminated to core material; with continuous, interlocking molding strip or lapped-and-formed edge closures; corners secured by welding or clips and exposed welds ground smooth. Exposed surfaces shall be free of pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections.

1. Core Material: Manufacturer’s standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 1 inch for doors and panels and 1-1/4 inches for pilasters.

2. Grab Bar Reinforcement: Provide concealed internal reinforcement for grab bars mounted on units.
3. Tapping Reinforcement: Provide concealed reinforcement for tapping (threading) at locations where machine screws are used for attaching items to units.

E. Urinal-Screen Construction:

1. Flat-Panel Urinal Screen: Matching panel construction.
2. Integral-Flange, Wall-Hung Urinal Screen: Similar to panel construction, with integral full-height flanges for wall attachment, and maximum 1-1/4 inches thick.

F. Facing Sheets and Closures: Electrolytically coated or hot-dip galvanized-steel sheet with nominal base-metal (uncoated) thickness standard with manufacturer.

G. Pilaster Shoes and Sleeves (Caps): Stainless-steel sheet, not less than 3 inches high, finished to match hardware.

H. Urinal-Screen Post: Manufacturer's standard post design of material matching the thickness and construction of pilasters; with shoe and sleeve (cap) matching that on the pilaster.

I. Brackets (Fittings):

1. Full-Height Continuous Type: Manufacturer's standard design; for both urinal and toilet partitions; stainless-steel.

J. Steel Sheet Finish: Manufacturer's standard baked-on-finish, with one color in each room.

1. Color: Pebble (from Accurate Partitions Corporation).

2.3 ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.

1. Material: Chrome-plated, nonferrous, cast zinc alloy (zamac) or clear anodized aluminum.

2. Hinges: Manufacturer's standard paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees.
3. Latch and Keeper: Manufacturer's standard latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.

4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.

5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.

6. Door Pull: Manufacturer’s standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.

B. Overhead Bracing: Manufacturer’s standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer’s standard finish.

C. Anchorages and Fasteners: Manufacturer’s standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel.

2.4 FABRICATION

A. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, fasteners, and anchors at pilasters to suit floor conditions. Make provisions for setting and securing continuous head rail at top of each pilaster. Provide shoes at pilasters to conceal supports and leveling mechanism.

B. Floor-Anchored Units: Provide manufacturer’s standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.

C. Urinal-Screen Posts: Provide manufacturer’s standard corrosion-resistant anchoring assemblies with leveling adjustment at tops and bottoms of posts. Provides shoes and sleeves (caps) at posts to conceal anchorage.

D. Door Size and Swings: Unless otherwise indicated, provide 24-inch wide in-swinging doors for standard toilet compartments and 36-inch wide out-swinging doors with a minimum 32-inch wide clear opening for compartments indicated to be accessible.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

1. Maximum Clearances:

a. Pilasters and Panels: 1/2 inch.
b. Panels and Walls: 1 inch.

B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Secure continuous head rail to each pilaster with not less than two fasteners. Hang doors to align tops

of doors with tops of panels and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

C. Stirrup-Brackets: Secure panels to walls and to pilasters with no fewer than two brackets attached near top and bottom of panel. Locate wall brackets so holes for wall anchors occur in masonry or tile joints. Align brackets at pilasters with brackets at walls.

D. Wall-Hung Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb and to resist lateral impact.

3.2 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION

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SECTION 10 26 00

WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Reinforced Plastic (FRP) Panels.
2. Related Corner Guards.

B. Fiberglass Sections include:

1. Division 6, Section “Plastic Paneling.”

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Include sections, details, and attachments to other work.

C. Samples: For each type of unit and for each color and texture required.

D. Maintenance data.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Surface-Burning Characteristics: As determined by testing identical products per ASTM E 84, NFPA 255, or UL 723 by UL or another qualified testing agency acceptable to authorities having jurisdiction.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store and acclimate wall-protection components per manufacturers’ instructions.

B. Deliver materials in manufacturer’s original, unopened containers and packaging with labels clearly identifying product name and manufacturer.

C. Inspect materials at delivery to assure that specified products have been received.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of impact-resistant wall-protection units that fail in materials or workmanship within specified warranty period.

PART 2 - PRODUCTS

2.1 CORNER GUARDS

A. Manufacturers: Subject to compliance with requirements, provide corner guards by one of the following manufacturers:

1. Inpro Co.
2. Marlite, Inc.
3. Approved Equal.

B. Corner Guards, General Information:

1. Leg Length: 1-1/2 inches.
2. Height: 48 inches.
3. Angle 90°.
4. Colors and Locations: See Finish Floor Plan.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Complete finishing operations, including painting, before installing system components.

B. Verify by examination that wall surfaces are acceptable to receive the specified systems. Notify the Architect in writing if wall surfaces are not acceptable. Do not begin installation until unacceptable conditions have been corrected.

C. Install according to manufacturer’s written instructions/recommendations.

D. Install materials level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

E. Immediately after completion of installation, clean surfaces in accordance with manufacturer’s instructions.

F. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION

SECTION 10 28 00

TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Public-use bathroom accessories.

B. Related Sections include the following:

1. Division 8 Section “Mirrors.”

1.3 REFERENCES

A. All work of this section shall be in strict accordance with Wisconsin Administrative Code Chapter SPS 362, ICC/ANSI A117.1, the International Building Code, and the ADA-ABA Accessibility Guidelines.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product Schedule: Located on Drawings.

PART 2 - PRODUCTS

2.1 BATHROOM ACCESSORIES

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. American Bathroom Accessories, Inc.
2. Basco, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Franklin Brass Manufacturing Co.
5. General Accessory Manufacturing Co. (GAMCO).
6. McKinney
7. Traymor Industries Inc.

B. Public-Use Bathroom Accessories:

1. Double toilet paper holder.
2. Grab bars.
3. Wall mounted soap dispenser.

4. Combination paper towel dispenser and waste receptacle.
5. Sanitary napkin disposals**,** to be located inside women's toilet compartments**.**
6. Baby changing station: Wall mounted. See Drawings for locations.

2.2 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal access keys for internal access to accessories for servicing and resupplying. Provide minimum of six (6) keys to Owner.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446. Provide solid blocking in wall framing.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation and verify that mechanisms function properly. Replace damaged or defective units. Remove temporary labels and protective covering.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION

SECTION 10 44 16

FIRE EXTINGUISHERS, CABINETS AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Fire Extinguishers.
2. Cabinets.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For fire protection cabinets. Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each exposed product and for each color and texture specified.

D. Operation and maintenance data.

E. Warranty: Sample of special warranty.

1.3 QUALITY ASSURANCE

A. Coordinate size of fire protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire protection cabinets with wall depths.

C. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, “Portable Fire Extinguishers.”

D. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

E. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

1.4 WARRANTY

A. Special Warranty: Manufacturer’s standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:
    a. Failure of hydrostatic test according to NFPA 10.
    b. Faulty operation of valves or release levers.
2. Warranty Period: Six (6) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Manufacturer's standard materials.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Larsen's Manufacturing Company.
    b. Or approved equal.

2. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B and bar coding for documenting fire extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type: UL-rated, dry chemical in manufacturer's standard enamel container.

C. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
    a. Orientation: Vertical.

2.3 FIRE PROTECTION CABINETS

A. Cabinet Type: Suitable for fire extinguisher.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Larson 2409, full glass door.
    b. Or approved equal.

B. Recessed Cabinet: Cabinet box recessed in walls of sufficient depth to suit style of trim indicated.

1. Trimless with Hidden Flange: Flange of same metal and finish as box overlaps surrounding wall finish and is concealed from view by an overlapping door.

C. Fire Protection Cabinets: Provide manufacturer's standard box (tub), with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated. Miter and weld joints and grind smooth.

D. Cabinet Material: Steel sheet.

E. Door Material: Steel sheet.

F. Door Style: Fully glazed, frameless, backless, acrylic panel.

G. Door Glazing: Clear float glass.

H. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type and door material and style indicated.

I. Finishes:

1. Manufacturer's standard baked-enamel paint for the following:
   a. Exterior of cabinet and door except for those surfaces indicated to receive another finish.
   b. Interior of cabinet and door.
2. Steel: Baked enamel or powder coat.
   a. Color and Gloss: As selected by Architect from manufacturer's full range.

2.4 ACCESSORIES

A. Mounting Brackets: Manufacturer's standard steel, designed to secure fire extinguisher to fire protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or red baked-enamel finish.

B. Break-Glass Strike: Manufacturer's standard metal strike, complete with chain and mounting clip, secured to cabinet.

C. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle.

D. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as directed by Architect.
1. Identify fire extinguishers in fire protection cabinets with the words "FIRE EXTINGUISHER."

   a. Location: Applied to cabinet door.
   b. Application Process: Pressure-sensitive vinyl letters
   c. Lettering Color: Red.
   d. Orientation: Vertical.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Examine walls and partitions for suitable framing depth and blocking where semi-recessed cabinets will be installed and prepare recesses as required by type and size of cabinet and trim style.

B. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

C. Install fire protection cabinets in locations and at mounting heights indicated.

D. Fire Protection Cabinets: Fasten cabinets to structure square and plumb.

E. Adjust fire protection cabinet doors to operate easily and without binding. Verify that integral locking devices operate properly.

F. Mount fire extinguishers in cabinets so the top of the extinguisher is not more than 4 feet above the floor.

G. Securely fasten mounting brackets and fire extinguisher cabinets to structure, square and plumb.

H. Identification: Apply vinyl lettering at locations indicated.

I. Adjust fire protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

J. Replace fire protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 22 00 00

PLUMBING

PART 1 - GENERAL

1.01 DESCRIPTION

A. *Work Included*: Provide plumbing where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:

1. Domestic Hot and Cold Water Piping;
2. Drain, Waste, and Vent Systems;
3. Propane Gas Distribution Systems;
4. Plumbing Fixtures and Trim;

B. *Related Work*:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
2. Cutting and patching existing exterior paving and hard surfaces for site utilities by the Plumbing Contractor.

C. *Work of Other Sections:*

1. Openings for new Plumbing work in new construction walls, floors, roof, ceiling, etc. shall be provided by the General Contractor. Location and size of these openings shall be the responsibility of the Plumbing Contractor.
2. Electrical line voltage wiring (110 volts and greater) by the Electrical Contractor. Wiring diagrams shall be furnished to the Electrical Contractor by the Plumbing Contractor.
3. Final gas piping connections for HVAC Equipment by the HVAC Contractor.
4. Roofing, exterior wall and related exterior openings shall be caulked, sealed and patched by the General Contractor.

1.02 GENERAL PROVISIONS

A. This specification Section is a general description of the work requirements. The particular descriptions are not intended to be all inclusive. Bidders shall also refer to the Drawings.

B. Prior to submitting a bid, the Contractor shall call the Engineer's attention (in writing only) to any materials or items of work believed to be inadequate. Bidders are required to visit the premises, take measurements, inspect existing conditions and limitations, and obtain first hand information necessary to submit a bid. The intent of the Contract is to obtain complete system installations, tested, ready for operation. No extras will be allowed because Contractor's misunderstanding of the scope work involved.

C. Everything essential for the completion of the work implied to be covered by these Specifications to make the system ready for normal and proper operation must be furnished and installed by this Contractor. Accordingly, any omission from either the plans or the Specifications, or both of details necessary for the proper installation and operation of the system shall not relieve this Contractor from furnishing such detail in full and proper manner.

D. The Drawings show various details indicating the general arrangement of the plumbing work, sizes and locations of piping, equipment, etc. The said Drawings with figures, lettering, etc., shall be

considered a part of these Specifications and no charge or alternation shall be made in any case unless ordered by the Engineer.

E. In addition to the Plumbing work, refer to the Plumbing work shown on the general Construction Drawings of the building as being part of this Contract, unless specified to be completed by other contractors.

1.03 QUALITY ASSURANCE

A. Use adequate number of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Without additional cost to the Owner, provide such other labor and materials as required to complete the work of the Section in accordance, with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in the Contract Documents.

C. In acceptance or rejection of installed work, the Architect or Engineer shall make no allowance for lack of skill on the part of the Workmen.

D. For the actual field fabrication, installation and testing of the Plumbing work, use only thoroughly trained and experienced workmen complete familiar with the items required and manufacturer's current recommended methods of installation.

E. *Reference Standards:*

ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASSE	American Society of Sanitary Engineering
ASTM	American Society of Testing and Material
AWWA	American Waterworks Association
CISPI	Cast Iron Soil Pipe Institute
FM	Factory Mutual
MCA	Mechanical Contractors Association
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NSF	National Sanitation Foundation
WQA	Water Quality Association

1.04 CODES AND PERMITS

A. This contractor must comply with building codes and other ordinances in force where the building is located as far as it apply to his work.

1. Engineer will provide approved plumbing plans from the Municipality or State having jurisdiction.

B. Plumbing work shall meet all Federal, State, Local Codes, ordinances and utility regulations.

1. In the event of conflict between or among specified requirements and pertinent regulations, the more stringent requirement will govern when so directed by the Engineer.

C. Plumbing Contractor must secure permits from proper offices and pay all legal fees as may be necessary for fulfilling the requirements of these specifications.

D. Submit one (1) copy of all permits to the Owner.

1.05 COORDINATION

A. Cooperate and coordinate with other trades to assure that all systems pertaining to the Plumbing work shall be installed in the best feasible arrangement. Coordinate as required with all other trades to share space in common areas and to provide the maximum of access to each system.

B. Arrange plumbing work in neat, well organized manner with piping and similar services running with primary lines of building construction, and with minimum of 8 foot overhead clearance, where possible.

C. Locate equipment properly to provide easy access, and arrange entire Plumbing Work with adequate access for operation and maintenance.

D. Give right-of-way to piping which must slope for drainage.

E. Where Plumbing work is to connect to existing, the Contractor must field verify all connection points before beginning any rough-in work. Verify gravity flow lines and proper invert elevations required prior to starting piping installation.

F. Coordinate site utility requirements with Site Contractor, along with inverts required to building.

1.06 ELECTRICAL PROVISIONS OF PLUMBING WORK

A. *Line Voltage Wiring:* The Electrical Contractor is to make all line voltage (100 volts and greater) electrical wiring connections for hookup of the units and systems.

B. *Low Voltage Control Wiring*: Exposed low voltage (less than 100 volts) temperature control wiring in connection with the Plumbing systems shall be in EMT conduit by the Plumbing Contractor in strict accordance with the applicable sections of the Electrical Specifications. *Concealed low-voltage control* wiring may be routed to equipment without conduit, unless subject to physical damage.

C. The Plumbing Contractor shall consult with the Electrical Contractor before ordering electrical motors, to ascertain correct electrical current characteristics. Plumbing Contractor shall furnish complete list and location of equipment requiring electrical connections and necessary wiring diagrams to the Electrical Contractor.

D. *Motors:* Where not otherwise indicated, comply with applicable provisions of the National Electrical Code, NEMA Standards, and sections of Division 16 of Specifications.

1. *Phases and Current:* 1/6 HP and smaller is Contractor's option; up to 1/3 HP, capacitor-start, 120 volt, 60 cycle single-phase; 1/2 HP and larger, squirrel-cage induction NEMA rated 200 volt, three-phase, 60 cycle. Provide 2 separate windings on 2 speed three-phase motors. Coordinate with actual current characteristics; refer to Division 16 of Specifications.
2. *High Efficiency Motors:* All motors 1 HP and larger shall be high efficiency motors meeting or exceeding values tested in accordance with IEEE Standards 112, Method B procedures as stated in NEMA MG 1-12.53a.
3. *Temperature Rating:* Class B insulation for 70 degree C temperature rise.
4. *Service Factor:* 1.15 for three-phase; 1.35 for single-phase.
5. *Construction:* General purpose, continuous duty.

6. *Frames:* NEMA Standard for horsepower specified.
7. *Overload Protection:* Built-in thermal, with internal sensing device for stopping motor, and for signaling where indicated.
8. *Bearings:* Permanently lubricated and sealed ball bearings.

G. *Motor Starter & Disconnect Switches:* Where motor starters and disconnect switches are indicated to be an integral part of equipment furnished by Plumbing Contractor, they shall meet requirements of Division 16 and shall be connected by the Electrical installer.

1. Field assembled motor starters and disconnect switches are to be the responsibility of the Electrical Contractor, unless indicated otherwise.

F. *Wiring Connections:* Wired connections in flexible conduit, except where plug-in electrical cords are indicated and permitted by governing regulations.

G. *General Wiring:* Comply with applicable provisions of Division 16 Section.

H. *Drip Pans:* Furnish drain pans below piping which passes directly above electrical work. Install drain piping and drain valve.

1.07 PAINTING PLUMBING WORK

A. *General*: All field painting of plumbing equipment shall be done by the General Contractor, unless equipment is specified otherwise or is to be furnished with factory-applied finish coats.

1. Field paint all exposed roof vents to match color recommended by Architect.

B. All equipment shall be provided with factory-applied prime and final coat paint finish, unless otherwise specified.

C. If factory-applied paint finish in any Plumbing equipment furnished by the Plumbing Contractor is damaged in shipment or during construction of the building, the equipment shall be refinished by the Plumbing Contractor to the satisfaction of the Architect or Engineer.

D. Prime paint all field-fabricated metal work under Plumbing work, comply with applicable provisions of Division 9.

1.08 PLUMBING SYSTEM IDENTIFICATION

A. *General:* Provide adequate marking of plumbing system and control equipment to allow identification and coordination of maintenance activities and maintenance manuals.

1. Furnish and install adequate marking, tagging and labeling of all *accessible and exposed* Plumbing equipment, piping and control devices, per ANSI A13.1-1981. Accessible locations shall include all ceiling spaces above accessible ceilings.

B. *Equipment:* Identify all major Plumbing equipment with plastic-laminate signs of 2" high painted stencils and contrasting background. Provide test of sufficient clarity and lettering to convey adequate information at each location and mount permanently. Identify control equipment by 1-1/2" x 4" plastic laminate nameplates with 1/4" high lettering.

C. *Piping:* Identify piping once every 30 feet at each branch, at termination of lines, and near valve or equipment connections. Place flow directional arrows at each piping identification. Provide lettering

of the appropriate size to convey information on wrap-around signage, adhesive-backed or paint stenciled labels.

D. *Valves:* Identify all valves with 1-1/2" diameter polished brass tags with stamp-engraved labels or plastic laminate tags. Prefix or color-code tags for each generic piping service. Prepare and submit valve tag schedule, listing location, service and tag description, and incorporate in Instruction Operations Manual.

E. Operational Labels: Where needed for proper or adequate information on operation and maintenance of plumbing systems, provide tags or labels of plasticized or laminated card stock, typewritten to convey the message.

1.09 FLOOR, WALL, ROOF AND CEILING OPENINGS

A. The General Contractor will be required to leave openings in ceiling, floors, walls, roof, partitions, etc., as required to install the Plumbing work specified or shown on the Drawings. The Plumbing Contractor is responsible for correct size and location of his openings. Where penetrations through existing construction are required, they shall be the responsibility of the Plumbing Contractor.

1. *Pipe Sleeves:* Schedule 40 black steel pipe, 1" larger than carrier pipe.

B. The Plumbing Contractor shall set sleeves and anchors for all equipment, etc., and shall provide watertight seals on pipes through exterior walls, floors and roof and where noted on the Drawings.

1. *Interior Sound Wall Penetrations*: All duct and piping penetrating sound walls shall be sleeved and sealed with fiberglass insulation and caulked for sound and odor control. Verify all required sound wall locations with Architect/General Contractor prior to bidding.

C. Pack annular space between sleeves and pipe with fiberglass insulation and seal with approved caulking materials. Where penetrations occur through fire-rated walls or floors, fill space with fire-resistive insulation similar to high-temperature mineral wool, US Gypsum Thermafiber batts or Cera-blanket FS insulation by Tremco. Seal openings with fire-resistive fire stop caulk/sealant.

1. Fire-proof plastic piping through fire-rated construction per approved UL listed assembly.

D. Provisions for openings, holes and clearances through walls, floors, ceilings and partitions to be made in advance of construction of such parts of the building.

E. If the Plumbing Contractor should neglect to inform the General Contractor of his opening requirements and that portion of the Building construction has been completed, the Plumbing Contractor shall pay the General Contractor for providing such openings.

F. Make arrangements with various other contractors for all special framing, spacing and chases. Mason will leave chases in mason work, but Plumbing Contractor is responsible for correct size and location.

1.10 CUTTING AND PATCHING

A. *General:* Refer to Division 1 General Requirements.

B. Perform all cutting and patching required for complete installation of the HVAC systems, unless specifically noted otherwise. Provide all materials required for patching unless otherwise noted.

1. All cutting and patching necessary of structural members to install any plumbing work shall not be done without permission, and then only carefully done under the direction of the Architect and General Contractor.

C. The Contractor shall not endanger any work of other trades by a demolition, cutting, digging or otherwise. Any cost caused by defective or ill-timed cutting and patching work shall be borne by the contractor responsible. Each contractor requiring cutting and patching shall hire men skilled in such cutting and patching to do the work.

1. All patching work in existing areas shall match existing work and restore the finish to its original condition in material, quality, texture, finish and color unless specifically noted or scheduled otherwise.

1.11 TESTS AND INSPECTIONS:

A. All plumbing tests shall be conducted in the presence of and to the satisfaction of the Governing Authorities, Architect/ Engineer, and Owner or his authorized representative.

B. The Plumbing Contractor shall be responsible for applying tests and ordering inspections as required by Federal, State and local Code and Inspection authorities.

1. All work shall remain exposed until it has been tested, inspected and approved.

1.12 TEMPORARY SERVICES

A. Provide temporary services for all plumbing services to the existing facility to maintain function of sanitary, storm, natural gas and water services during the construction period.

1.13 TRENCHING AND BACKFILLING

A. Trench, excavate and tunnel to place all piping and other related work necessary at the elevations indicated or required, as shown on the Drawings.

1. Cut bottom of trench to grade, make trench 12” wider than the widest dimension of the pipe.
2. All pipes shall be laid on a compacted bed of sand 6” deep. Do not lay piping on large stones, rocks or bricks.

B. Backfill in layers and compact sufficiently to prevent settlement. Backfill with damp sand and fine gravel mixture.

1. Exterior locations shall be backfilled to 12” of grade with sand and fine gravel mixture and the remainder with native compacted topsoil.
2. Do not start backfill operations until plumbing work has been properly inspected and approved.

1.14 CONCRETE FOR PLUMBING WORK

A. *General:* Comply with pertinent provisions of Division 1 and Division 3.

B. All concrete work for equipment pads by the Plumbing Contractor.

C. *Concrete Equipment Pads*: For each piece of floor or ground mounted plumbing equipment as indicated on the Drawings, provide a 4” concrete housekeeping pad at a minimum of 4 inches wider

than the full size of the respective equipment's base. Equipment pads are required for the following equipment:

1. Water heater & softener/brine tank.

1.15 EQUIPMENT ACCESS

A. *General:* All valves, equipment and accessories shall be installed to permit access to equipment for maintenance, servicing or repairs. This Contractor at no additional cost shall complete relocation of piping, or equipment to accomplish equipment access.

B. *Location:* Provide access doors where equipment is located in chases or inaccessible locations. Access panels shall be furnished by this Contractor and installed by the specific trade responsible for the material in which the access panels are installed.

C. *Construction:* Access doors in fire-rated construction must have UL label. Access doors shall be of size to provide adequate access to equipment concealed in wall, ceiling and furred-in spaces. Milcor or approved equal, 14-gauge steel frame and door, prime-coated, except stainless steel in areas subject to excessive moisture.

1.16 EQUIPMENT SUPPORTS

A. *General:* Provide all supporting steel and related materials not indicated on structural drawings as required for the installation of equipment and materials, including angles, channels, beams and hangers.

1. Prime coat paint all metal supports.

1.17 EQUIPMENT GUARDS

A. *General:* Provide equipment guards over belt-driven assemblies, pump shafts, exposed fans and related elsewhere, as indicated in this specification or required by Code.

1. All belt guards shall be OSHA-approved type.

1.18 GUARANTEE

A. All material and workmanship must be new and first class in every respect; the plumbing equipment must be turned over to the owner in complete working order and free from mechanical or performance defects.

B. The Plumbing Contractor must guarantee all labor and materials for one (1) year from the completion of the plumbing system. Maintain and repair plumbing equipment for the above period, unless such defects are clearly the result of bad management after plumbing system is turned over to the Owner.

C. Before final acceptance of the plumbing work, the Plumbing Contractor shall have the entire apparatus and system in complete and satisfactory operation and shall maintain same in satisfactory and continuous operation for a period of ten days prior to the date of acceptance; fuel to be furnished by Owner.

D. The Plumbing Contractor shall submit to the Engineer in triplicate, at the completion of his work, a certified statement, signed by a principal of the firm, stating that the system has been fully installed and is operating within the intent of the Drawings and Specifications and that all system components have

been tested and adjusted. This statement shall be submitted before the system is presented to the Owner for final inspection.

1.19 SUBMITTALS

A. Refer to Division 1 for additional submittal requirements.

B. The Plumbing Contractor will be held responsible for correction of work deemed necessary by the Engineer due to proceeding with the work without shop drawings that have the Architect/Engineers final approval.

C. Shop drawings shall include data on physical dimensions, gauges, materials of construction and capacities.

1. Incomplete drawings will be disapproved.

D. This Contractor will be responsible for all figures and dimensions shown on the shop drawings. Approval of shop drawings describing equipment that cannot fit in the space allotted does not relieve this Contractor from providing equipment that will meet the space requirements.

E. Submit six (6) copies of shop drawings to the Architect/Engineer for approval, with complete detail for all equipment, materials, etc., to be furnished and installed for this project as follows:

1. Valves;
2. Pipe and piping specialties;
3. Insulation systems;
4. Plumbing fixtures;
5. Water heater;
6. Hot water recirculation pump and aquastat;
7. Water Softener;
8. Instructions and O&M manuals(2 copies);
9. As-built Drawings(1 copy).

F. Submit to the local building authority for approval: equipment cuts, O&M manuals, Installation manuals, and any UL listed assemblies employed to penetrate fire-rated assemblies.

1.20 HOUSEKEEPING AND CLEANUP

A. Periodically as work progress and/or as directed by the Architect/Engineer, the Contractor shall remove waste materials from the building and leave the area of the workroom clean. Upon completion of work remove all tools, scaffolding, broken and waste materials, etc., from the site.

1.21 LUBRICATION

A. Upon completion of the work and before turning over to the Owner, clean and lubricate all bearings except sealed and permanently lubricated bearings. Use only lubricant recommended by the manufacturer.

1. The Contractor is responsible for maintaining lubrication of all mechanical equipment under his contract until work is accepted by the Owner.

B. Furnish a chart with each piece of equipment listed, itemizing location for lubricant required and recommended periods of lubrication. Incorporate chart in Instruction Manual.

1.22 INSTRUCTIONS AND MANUALS

A. Upon completion of the installation, but before final acceptance of the system, the Plumbing Contractor shall instruct the Owner on the care and operation of all parts of the Plumbing system.

B. Assemble two (2) complete sets of manufacturer's printed operating and maintenance instructions for all mechanical equipment and installed under this contract. Prepare in bound copies complete with index tabs. Information must include parts lists, equipment warranties, and wiring diagrams. Submit bound copies to Architect for disbursement.

1.23 AS-BUILT DRAWINGS

A. During construction maintain a set of prints showing installed as-built work for the project.

B. Upon completion of construction before final acceptance, provide a set of as-built drawings to the Architect/Engineer.

PART 2 - PRODUCTS

2.01 DOMESTIC WATER PIPE SCHEDULE

A. *Above Ground Piping:*

1. Type 'L' copper water tube, H(hard drawn) temper, ASTM B88; with cast copper fittings, ANSI B16.18; wrought copper fittings, ANSI B16.22; lead-free(less than 0.2%) solder, ASTM B32; flux ASTM B813.
2. PEXa tubing approved for potable water piping: Crosslinked Polyethylene, ASTM F876 & ASTM F877. Fittings: Insert type fittings with cold flaring memory type fittings equal to Uponor. Crimp or compression ring fittings will not be allowed.
3. Copper mechanical grooved fittings and couplings on roll grooved pipe(propress) may be used in lieu of soldered fittings.

B. *Below Ground*: 2-1/2" and Smaller:

1. Type 'K' copper water tube, O(annealed-soft) temper, ASTM B88; with cast copper fittings, ANSI B16.18; wrought copper fittings, ANSI B16.22; lead-free(less than 0.2%) solder, ASTM B32; flux ASTM B813; or cast copper flared pressure fittings, ANSI B16.26.
2. PEXa tubing approved for potable water piping: Crosslinked Polyethylene, ASTM F876 & ASTM F877. Fittings: Insert type fittings with cold flaring memory type fittings equal to Uponor. Crimp or compression ring fittings will not be allowed.

2.02 DRAIN, WASTE AND VENT PIPE SCHEDULE

A. *Interior Above Ground:*

1. Cast iron soil pipe and fittings, hub and spigot, service weight, ASTM A74; with gasketted neoprene joints.
2. Hubless cast iron soil pipe and fittings, CISPI 301; with no-hub couplings, CISPI 310.
3. PVC plastic pipe, Schedule 40, Class 12454-B(PVC 112), ASTM D1785; PVC plastic drain, waste and vent pipe and fittings, ASTM D2665; socket fitting patterns, ASTM D3311; primer, ASTM F656; solvent cement, ASTM D2564.

4. Galvanized steel vent pipe, Schedule 40, zinc-coated, ASTM 120 or 53 Grade B; malleable iron threaded fittings, zinc-coated.
5. Type "DWV" copper water tube, H(hard drawn) temper, ASTM B88; with cast copper drainage fittings(DWV), ANSI B16.23; wrought copper drainage fittings(DWV) , ANSI B16.29; lead-free(less than 0.2%) solder, ASTM B32; flux, ASTM B813.

B. *Interior Below Ground:*

1. Cast iron soil pipe and fittings, hub and spigot, service weight, ASTM A74; with gasketted neoprene joints.
2. PVC plastic pipe, Schedule 40, Class 12454-B(PVC 112), ASTM D1785; PVC plastic drain, waste and vent pipe and fittings, ASTM D2665; socket fitting patterns, ASTM D3311; primer, ASTM F656; solvent cement, ASTM D2564.

2.03 PROPANE GAS PIPING

A. *Above Ground:*

1. Type 'L' copper water tube, H(hard drawn) temper, ASTM B88; with cast copper fittings, ANSI B16.18; wrought copper fittings, ANSI B16.22; lead-free(less than 0.2%) solder, ASTM B32; flux ASTM B813.
2. Black steel pipe, Schedule 40, Type F, Grade A, ASTM A53; with black malleable iron threaded fittings, Class 150, ASTM A197/ANSI B16.3; Seamless carbon steel weld fittings, standard weight ASTM A234 grade WPB/ANSI B16.9.

B. *Below Ground:*

1. Type 'L' copper water tube, H(hard drawn) temper, ASTM B88; with cast copper fittings, ANSI B16.18; wrought copper fittings, ANSI B16.22; lead-free(less than 0.2%) solder, ASTM B32; flux ASTM B813.

C. Gas valves:

1. 2" and smaller: Ball valve, bronze-body, threaded ends, stainless steel ball, full or conventional port, teflon seat, blowout-proof stem, two-piece construction suitable for 150 psig working pressure, U.L. listed for use as a natural gas shut-off valve.
2. Gas Pressure Regulators: UL listed bronze-body, threaded ends, ventless relief. Maxitrol series.

2.04 VALVES

A. *Approved Manufacturers:*

1. Conbraco Apollo;
2. Milwaukee;
3. Watts;
4. Nibco.

B. *Check valves:*

1. *2" and smaller:* Bronze, screwed, Y-pattern, 200# WOG, swing check type.

C. *Ball valves:*

1. *2" and smaller:* Two or Three piece, bronze-body, chrome-plated bronze ball, Teflon seat and packing, 400 pig WOG, with stem extensions on insulated piping. Appollo 70-200 series.

2.05 VENT FLASHING

A. Where pipes of this Section pass through the roof, flash the opening with seamless 3 lb./sq.ft. lead flashing with 15" x 17" minimum base size, steel reinforced boot and cast iron counterflashing sleeve.

B. *Approved Manufacturers:* SSMC, Oatey or approved equal.

2.06 PIPE HANGERS

A. *Piping:*

1. Split ring hangers with supporting rods.
2. Adjustable clevis.

B. *Multiple or Trapeze Hangers:*

1. Steel channels with welded spacers and hanger rods.

C. *Floor Support:*

1. Painted steel pipe saddle, stand and bolted floor flange.

D. *Copper Pipe Supports:*

1. All supports, fasteners, clamps, etc. directly connected to copper piping shall be copper-plated or polyvinylchloride(PVC)-coated.
2. Where steel strut supports are used, provide isolation collar between supports/clamp and copper piping.

E. *Approved Manufacturers*: Fee and Mason, B-line, Grinnell or approved equal.

2.07 CLEANOUTS

A. *Exterior:* Smith #4253 with XH cast iron top in concrete areas.

B. *Interior Floors:* Smith 4930-PB square nickel-bronze top.

C. *Finished walls:* Smith #4532 stainless steel with access plate and screw.

D. Provide cleanout plugs of extra heavy bronze

E. *Approved Manufacturers:* Josam, Smith, Wade, Zurn or approved equal.

2.08 ACCESS

A. *General:* All piping, conduit and accessories shall be installed to permit access to equipment for maintenance. Any relocation of piping, equipment or accessories required to provide maintenance access shall be accomplished by the Contractor at no additional cost.

B. *Removable Access Plates:* Where only hand access is sufficient for valve access, provide removable plate-type access unit of minimum size which will facilitate required access.

1. Provide units of type, style, design, material and finish appropriate for location and exposure in each instance.
2. In exposed surfaces of occupied spaces provide round plate units, flush floor units and frameless low-profile wall units, primed-for-paint in painted surfaces and polished chrome or stainless steel finish in other surfaces.

C. *Walls:*

1. Smith #4767 flush wall stainless steel cover plate with screw latch lock in finished tile walls at wet locations.
2. Smith #4760 or #4765 with bonderized prime-coated steel face and screw latch lock in walls of other finished rooms.

D. *Ceilings:*

1. Provide Smith #4765 flush ceiling bonderized prime-coated steel face with screw latch lock.

E. *Floors:*

1. Smith #4910 with aluminum or nickel-bronze non-skid top.

2.09 WATER HAMMER ARRESTORS

A. Provide Smith #5000 series or equal, stainless steel or air chambers at each fixture group utilizing a flush valve or fast closing solenoid valve, as sized and recommended by the manufacturer.

B. *Approved Manufacturers:* Josam, PPP, Smith, Wade, Zurn or approved equal.

2.10 HANDICAPPED INSULATION

A. Where shown on the Drawings or required by governmental agencies having jurisdiction, provide "Truebro" insulation system or approved equal on exposed hot
and cold water supply piping, waste tailpiece and trap at lavatories requiring ADA compliance.

2.11 PIPE INSULATION

A. *General:* Provide composite piping insulation (insulation, jackets, coverings, sealers, mastics, and adhesives) with ratings not exceeding flame spread of 25 and a smoke developed of 50 in active return air plenums. Ratings in all other areas shall not exceed a flame spread of 25 and a smoke developed of 150 (test method ASTM E-84). Comply with all codes regarding the use of foam insulation.

B. Insulate piping located in interior space, including (but not necessarily limited to) the following services:

1. Interior cold and hot domestic water piping.

C. Insulate each piping system with one of the following types and thickness of insulation, except as otherwise indicated (Installer's option where more than one type is indicated).

1. *Fibrous Glass:* Minimum density 3 lb./cu.ft., thermal conductivity of not more than 0.23 at 75 degrees F mean temperature, suitable for temperatures to 450 degrees F. Kraft-reinforced, foil-vapor barrier, laminate all-service jacket, factory applied to insulation with a self-sealing pressure sensitive adhesive lap, maximum permeance of 0.02 perms and minimum beach puncture resistance of 50 units.

2. *Elastomeric Insulation:* Closed-cell type, with minimum nominal density of 5.5 lbs./cu.ft., thermal conductivity shall be not more than 0.27 at 75 degrees F mean temperature, and maximum water vapor transmission of 0.17 perm/inch. The material shall be suitable for a temperature range from 220 degrees F to minus 40 degrees F.

D. *Insulation Installation Schedule:*

	Service	*Pipe Size*	*Insulation Thickness*
1.	Hot Water Piping	Less than 1"	1"
		1-1/4 thru 4"	1"
2.	Cold Water Piping	Less than 1"	½"
		1-1/4"thru 4"	1"

2.12 FIXTURES AND EQUIPMENT

A. *General:* Provide plumbing fixture, trim, and equipment as shown on the ***"Fixture and Equipment Schedule"*** on the Contract Drawings, and as specified herein.

B. All vitreous chinaware and porcelain fixtures shall be select quality.

1. All wastes and supplies for fixtures, except as otherwise specified or required, shall turn back into walls.

C. All trim, except as otherwise specified, shall be constructed of brass. Finish shall be polished chrome, except where concealed(inside cabinets, etc.).

D. Faucets shall have replaceable control assemblies or replaceable washers and seats.

E. Exposed waste fittings shall be constructed of 17 gauge tubular brass. Slip joints are permitted only on the fixture side of the trap.

F. All fixtures with non-accessible traps such as bathtubs, showers, floor drains, shall have a completely removable stopper or grate in order to be accessible for cleanout.

G. Stops are to be provided at each fixture. It is the Contractor's option to install straight or angle type. All stops are shall have a minimum of ½" inlets with flexible riser and loose key handles where exposed to the public.

1. All loose stops shall be from the same manufacturer.

H. *Hair Interceptor Trap:* Smith #8750T or approved equal with stainless steel basket and removable bottom plug

I. *Approved manufacturer's for Vitreous China and enameled Cast Iron Fixtures:*

1. American Standard;
2. Crane;
3. Elijer;

4. Kohler.

J. *Approved manufacturer's for Stainless Steel Sinks:*

1. American Standard;
2. Dayton/Just;
3. Elkay;
4. Kohler.

K. *Approved manufacturers for Water Closet Seats:*

1. Bemis;
2. Church;
3. Kohler;
4. Olsonite.

L. *Approved manufacturers for Sink and Lavatory Fittings:*

1. American Standard;
2. Chicago faucet;
3. Delta;
4. T&B Brass;
5. Symmons;
6. Speakman.

M. *Approved manufacturers for Supplies, Stops and Traps:*

1. McGuire Mfg. Co.;
2. Brass Craft;
3. Chicago Faucet;
4. Kohler.

2.13 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 SITE UTILITIES

A. Provided by others.

3.03 PLUMBING SYSTEM LAYOUT

A. Lay out the plumbing system in careful coordination with the Drawings, determining proper elevations for all components of the system and using only the minimum number of bends to produce a satisfactorily functioning system.

B. Follow the general layout shown on the Drawings in all cases except where other work may interfere.

C. Lay out pipes to fall within partition, wall, or roof cavities, and to not require furring other that as shown on the Drawings.

D. Where work is to connect to existing, Plumbing contractor must field verify all connection points before beginning any rough-in work. Verify all connecting invert elevations and flow lines of new work connected to existing gravity drainage.

3.04 TRENCHING AND BACKFILLING

A. Perform trenching and backfilling associated with the work of this Section in strict accordance with the provisions of Division 2 of these Specifications.

B. Cut bottom of trenches to grade. Make trenches 12" wider than the greatest dimension of the pipe.

C. Bedding and backfilling:

1. Install piping promptly after trenching. Keep trenches open as short a time as practicable.
2. Under the building, install pipes on a 6" bed of damp sand. Backfill to bottom of slab with damp sand.
3. Outside the building, install underground piping on a 6" bed of damp sand. Backfill to within 12" of finish grade with damp sand. Backfill remainder with native topsoil.
4. Do not backfill until installation has been approved and until Project Record Documents have been properly annotated.

3.05 INSTALLATION OF PIPING AND EQUIPMENT, GENERAL

A. General:

1. Proceed as rapidly as the building construction will permit.
2. Thoroughly clean items before installation. Cap pipe openings to exclude dirt until fixtures are installed and final connections have been made.
3. Cut pipe accurately, and work into place without springing or forcing properly clearing window, doors, and other openings. Excessive cutting or other weakening of the building will not be permitted.
4. Show no tool marks or threads on exposed plated, polished, or enameled connections from fixtures. Tape all finished surfaces to prevent damage during construction.
5. Make changes in directions with fittings; make changes in main sizes with eccentric reducing fittings. Unless otherwise noted, install water supply and return piping with straight side of eccentric fittings at top of the pipe.
6. Run horizontal sanitary piping at a uniform grade of 1/4" per ft., unless otherwise noted. Run horizontal water piping with an adequate pitch upwards in direction of flow to allow complete drainage.
7. Provide sufficient swing joint, ball joints, expansion loops, and devices necessary for a flexible piping system, whether or not shown on the Drawings.
8. Support piping independently at pumps, coils, tanks, and similar locations, so that weight of pipe will not be supported by the equipment.

9. Pipe the drains from pump glands, drip pans, relief valves, air vents, and similar locations, to spill an open sight drain, floor drain, or other acceptable discharge point, and terminate with a plain and unthreaded pipe 6" above the drain.
10. Securely bolt all equipment, isolators, hangers, and similar items in place.
11. Support each item independently from other pipes. Do not use wire for hanging or strapping pipes.
12. Provide complete dielectric isolation between ferrous and non-ferrous metals.
13. Provide union and shut off valves suitably located to facilitate maintenance and removal of equipment and apparatus.

B. Equipment access:

1. Install piping, equipment, and accessories to permit access for maintenance. Relocate items as necessary to provide such access, and without additional cost to the Owner.
2. Provide access doors where valves, motors, or equipment requiring access for maintenance are located in wall or chases or above ceilings. Coordinate location of access doors with other trades as required.

3.06 PIPE JOINTS

A. Copper tubing:

1. Cut square, remove burrs, and clean inside of female filling to a bright finish.
   a. Apply solder flux with brush to tubing.
   b. Remove internal parts of solder-end valves prior to soldering.
2. Provide dielectric unions at points of connection of copper tubing to ferrous piping and equipment.
3. For joining copper tubing, use the following:
   a. Water piping 3" and smaller: 95-5 solder;
   b. Water piping larger than 3": "Sil-fos" brazing;
   c. Underground: "Sil-fos" brazing.

B. Screwed piping:

1. Deburr cuts.
   a. Do not ream exceeding internal diameter of the pipe.
   b. Thread to requirements of ANSI B2.1.
2. Use Teflon tape on male thread prior to joining other services.
3. Use litharge and glycerin on joint prior to cleaning for air and oil piping.

C. Leaky joints:

1. Remake with new material.
2. Remove leaking section and/or fitting as directed.
3. Do not use thread cement or sealant to tighten joint.

3.07 PIPE SUPPORTS

A. Support suspended piping with clevis or trapeze hangers and rods.

B. Space hangers and support for horizontal steel pipes according to the following schedule:

Pipe size:	Maximum spacing on centers:
1-1/4" and smaller:	8'-0"
1-1/2" to 3":	10'-0"
4" to 5":	14'-0"

C. Space hangers and supports for horizontal copper tubing according to the following schedule:

Tube size:	Maximum spacing on centers:
1" and smaller:	6'-0"
1-1/2":	7'-0"
2":	8'-0"
2-1/2":	9'-0"
3" and larger:	10'-0"

D. Provide sway bracing on hangers longer than 18".

E. Support vertical piping with riser clamps secured to the piping and resting on the building structure. Provide at each floor unless otherwise noted.

F. Provide insulation continuous through hangers and rollers. Protect insulation by galvanized steel shields.

G. Arrange pipe supports to prevent excessive deflection, and to avoid excessive bending stress.

H. Hubless piping:

1. Provide hangers on the piping at each side of, and within 6" of, hubless pipe coupling so the coupling will bear no weight.
2. Do not provide hangers on couplings.
3. Provide hangers adequate to maintain alignment and to prevent sagging of the pipe.
4. Make adequate provision to prevent shearing and twisting of the pipe and the joint.

3.08 SLEEVES AND OPENINGS

A. Provide sleeves for each pipe passing through walls, partitions, floors, roofs, and ceilings.

1. Set pipe sleeves in place before concrete is placed.
2. For uninsulated pipe, provide sleeves two pipe sizes larger than the pipe passing through, or provide a minimum of 1/2" clearance between inside and outside of the pipe.
3. For insulated pipe, provide sleeves of adequate size to accommodate the full thickness of pipe covering, with clearance for packing and caulking.

B. Caulk the space between sleeve and pipe or pipe covering, using a noncombustible, permanently plastic, waterproof, non-staining compound which leaves a smooth finished appearance, or pack with noncombustible asbestos cotton, or fiberglass to within 1/2" of both wall faces, and provide the waterproof compound described above.

C. Finish and escutcheons:

1. Smooth up rough edges around sleeves with plaster or spackling compound.
2. Provide 1" wide chrome or nickel plated escutcheons on all pipes exposed to view where passing through walls, floors, partitions, ceilings, and similar locations.
   a. Size the escutcheons to fit pipe and covering.
   b. Hold escutcheons in place with set screw.

3.09 CLEANOUTS

A. Secure the Architect's approval of locations for cleanouts in finished areas prior to installation.

B. Provide cleanouts of same nominal size as the pipes they serve; except where cleanouts are required in pipes 4" and larger provide 4" cleanouts.

C. Make cleanouts accessible. After pressure tests are made and approved, thoroughly graphite the cleanout threads.

3.10 VALVES

A. Provide valves in water and gas systems. Locate and arrange so as to give complete regulation of apparatus, equipment, and fixtures.

B. Provide valves in at least the following locations:

1. In branches and/or headers of water piping serving a group of fixtures.
2. On both sides of apparatus and equipment.
3. For shutoff of risers and branch mains.
4. For flushing and sterilizing the system.
5. Where shown on the Drawings.

C. Locate valves for easy accessibility and maintenance.

3.11 WATER HAMMER ARRESTORS

A. Provide water hammer arrestors on hot water lines and cold water lines.

1. Install in upright position at all quick closing valves, isolated plumbing fixtures, and supply headers at plumbing fixture groups.
2. Locate and size as specified, locate in accordance with Plumbing and Drainage Institute Standard WH-201.
3. Install water hammer arrestors behind access panels.

3.12 BACKFLOW PREVENTION

A. Protect plumbing fixtures, faucets with hose connections, and other equipment having plumbing connection, against possible back siphonage.

B. Arrange for testing of backflow devices as required by the governmental agencies having jurisdiction.

3.13 PLUMBING FIXTURE INSTALLATION

A. <u>Installation:</u>

1. Set fixtures level and in proper alignment with respect to walls and floors, and with fixtures equally spaced.
2. Provide supplies in proper alignment with fixtures and with each other.

B. Grout wall and floor mounted fixtures watertight where the fixtures are in contact with walls and floors.

C. Caulk deck-mounted trim at the time of assembly, including fixture and casework mounted. Caulk self-rimming sinks installed in casework.

3.14 DISINFECTION OF WATER SYSTEMS

A. Disinfect hot and cold water systems.

1. Perform disinfection under the Architect's observation. Notify the Architect at least 48 hours prior to start of the disinfection process.
2. Upon completion of disinfecting, secure and submit the Certificate of Performance, stating system capacity, disinfectant used, time and rate of disinfectant applied, and resultant residuals in ppm at completion.
3. Use disinfectant method approved by the Architect.

B. When disinfection operation is completed, and after final flushing, secure an analysis by a laboratory approved by the Architect, based on water samples from the system, showing test negative for coli-aerogene organisms. Provide a total plate count of less than 100 bacteria per cc, or equal to the control sample.

C. If analysis results are not satisfactory, repeat the disinfection procedures and retest until specified standards are achieved.

3.15 OTHER TESTING AND ADJUSTING

A. Provide personnel and equipment, and arrange for and pay the costs of, all required tests and inspections required by governmental agencies having jurisdiction.

B. Where test show materials or workmanship to be deficient, replace or repair as necessary, and repeat the tests until the specified standards are achieved.

C. Adjust hot water recirculation pump timer and aquastat per Owner’s usage schedule.

D. Adjust the system to optimum standards of operation.

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SECTION 23 00 00

HEATING, VENTILATING AND AIR CONDITIONING

PART 1 - GENERAL

1.01 DESCRIPTION

A. *Work Included:* Provide heating, ventilating, and air conditioning systems where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:

1. Gas-fired, sealed-combustion furnace units, direct-expansion cooling coil sections, operating and safety controls, blowers, motors, compressors, filters, refrigeration piping and related items;
2. Air-cooled condensing units;
3. Energy recovery units, filters, blowers, motors, desiccant wheel, operating and safety controls and related items;
4. Supply, return and fresh air ductwork system with grilles, diffusers, registers, and ductwork accessories;
5. Exhaust systems including dampers, grilles, registers, louvers, controls, and related items;
6. Temperature control systems including low-voltage wiring, relays, timeclocks, thermostats, control dampers and damper operators, and related items;
7. Acoustical and thermal insulation of ductwork and related equipment;
8. Installation of anesthesia scavenger provided by the Owner exhaust system with piping;
9. Electric Heat;
10. Test, adjust, and balance air systems;
11. O&M manuals, warranty work and Owner instructions.

B. *Related Work*:

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications.
2. Equipment structural supports, insulated curbs etc.
3. Condensate piping from condensate pans and collection legs to open site drains.
4. Final gas connections to HVAC equipment.
5. Anesthesia scavenger exhaust fan furnished by Owner, installed by HVAC Contractor, along with PVC vent piping and exhaust vent from fan unit.
6. Gas piping by HVAC Contractor.
7. Roofing, exterior wall and related exterior opens shall be caulked, sealed and patched by the HVAC Contractor.
8. Cutting and patching 0enings for HVAC workk in existing walls, floors, roof, ceiling, etc., will be provided by the HVAC Contractor.

C. *Work of Other Sections*:

1. Openings for ventilating work in new walls, floors, roof, ceiling, etc., will be provided by General Contractor. Location and size of these openings will be the responsibility of the HVAC Contractor.
2. Equipment support curbs furnished by the HVAC Contractor, installed by the General Contractor.
3. Lintels and structural supports for HVAC openings and equipment by the General Contractor.

4. Electrical line voltage wiring (110 volts and greater). The HVAC Contractor will furnish wiring diagrams to Electrical Contractor.
5. Motor starters not provided integral with HVAC equipment shall be provided by the Electrical Contractor.
6. Floor drains and open site drains by Plumbing Contractor.
7. Painting HVAC equipment will be the responsibility of General Contractor.

1.02 GENERAL PROVISIONS

A. Everything essential for the completion of the work implied to be covered by these Specifications to make the system ready for normal and proper operation must be furnished and installed by this Contractor. Accordingly, any omission from either the plans or the Specifications, or both, of details necessary for the proper installation and operation of the system shall not relieve this Contractor from furnishing such detail in full and proper manner.

B. The plans show various details indicating the general arrangement of the heating and ventilating work, sizes and locations of pipe work, ducts, units, etc., the said plans with figures, lettering, etc., shall be considered a part of these Specifications and no charge or alternation shall be made in either case unless ordered by the Engineer.

C. In addition to the heating and ventilating plans, see General Plans of the building, as all heating and ventilating work appearing on the latter plans will be part of this Contract unless especially specified to be done by other contractors, as well as, the said work detailed on the heating and ventilating plans.

1.03 QUALITY ASSURANCE

A. *Qualifications of Installers*:

1. For the actual fabrication, installation and testing of heating and ventilating work, use only thoroughly trained and experienced workmen completely familiar with the items required and manufacturer's current recommended methods of installation.
2. In acceptance or rejection of installed work, the Architect or Engineer shall make no allowance for lack of skill on the part of the Workmen.

B. *Reference Standards*: The following standards are imposed, as applicable to work in each instances:

AABC	Associated Air Balance Council
ARI	Air Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
MCA	Mechanical Contractors Association
MSS	Manufacturers Standardized Society
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
SMACNA	Sheet Metal and Air Conditioning Contractors National Association

C. Environmental design conditions for all occupied areas are as follows:

Inside:	70 deg. F	74 deg. F/64 deg. wbF
Outside:	-15 deg. F	91 deg. dbF/74 deg. wbF

1.04 CODES AND PERMITS

A. This Contractor must comply with building laws and other ordinances in force where the building is located as far as same apply to his work.

1. IBC 2009.
2. IMC 2009; SPS 64.
3. IECC 2009; SPS 63.

B. He must secure permits from proper offices and pay legal fees as may be necessary for fulfilling the requirements of these Specifications.

C. One (1) copy of all permits must be furnished to the Owner.

1.05 COORDINATION

A. Cooperate and coordinate with other trades to assure that all systems in the heating and ventilating work may be installed in the best arrangement. Coordinate as required with all other trades to share space in common areas and to provide the maximum of access to each system.

B. Arrange heating and ventilating work in neat, well organized manner with piping and similar services running parallel with primary lines of building construction, and with minimum of 8 foot overhead clearance where possible.

C. Locate operating and control equipment properly to provide easy access, and arrange entire heating and ventilating work with adequate access for operation and maintenance.

D. Give right-of-way to piping which must slope for drainage.

1.06 ELECTRICAL PROVISIONS OF HVAC WORK

A. *Line Voltage Wiring*: The Electrical Contractor is to make all line voltage (100 volts and greater) electrical wiring connections for hookup of the units and systems.

B. *Control Wiring*: Exposed low voltage (less than 100 volts) temperature control wiring in connection with heating and ventilating system shall be in EMT conduit by the Heating Contractor in strict accordance with the applicable sections of the Electrical Specifications. *Concealed control wiring* may be routed to equipment without conduit, unless subject to physical damage.

C. This Contractor shall consult with the Electrical Contractor before ordering electrical motors, to ascertain correct electrical current characteristics. HVAC Contractor shall furnish complete list and location of equipment requiring electrical connections and necessary wiring diagrams to Electrical Contractor.

D. *Motors*: Where not otherwise indicated, comply with applicable provisions of the National Electrical Code, NEMA Standards, and sections of Division 16 of Specifications.

1. *Phases and Current*: 1/6 HP and smaller is Contractor's option; up to 1/3 HP, capacitor-start, 120 volt, 60 cycle single-phase; 1/2 HP and larger, squirrel-cage induction NEMA rated 200 volt, three-phase, 60 cycle. Provide two (2) separate windings on 2 speed three-phase motors. Coordinate with actual current characteristics; refer to Division 16 of Specifications.

2. *High Efficiency Motors*: All motors 1 HP and larger shall be high efficiency motors meeting or exceeding values tested in accordance with IEEE Standards 112, Method B procedures as stated in NEMA MG 1-12.53a.
3. *Service Factor*: 1.15 for three-phase; 1.35 for single-phase.
4. *Construction*: General purpose, continuous duty.
5. *Frames*: NEMA Standard for horsepower specified.
6. *Overload Protection*: Built-in thermal, with internal sensing device for stopping motor, and for signaling where indicated.

E. *Starter and Switches*: Where motor starters and switches are indicated to be an integral part of equipment furnished by Heating installer, they shall meet requirements of Division 16 and shall be connected by the Electrical installer.

F. *Wiring Connections*: Wired connections in flexible conduit, except where plug-in electrical cords are indicated and permitted by governing regulations.

G. *General Wiring*: Comply with applicable provisions of Division 16 Section.

1.07 PAINTING HVAC WORK

A. *General:* All field painting of mechanical equipment will be done by the General Contractor unless equipment is specified otherwise or is to be furnished with factory-applied finish coats.

B. All equipment shall be provided with factory-applied prime finish, unless otherwise specified.

C. If the factory shop paint finish on any equipment furnished by the Contractor is damaged in shipment or during construction of the building, the equipment shall be refinished by the Contractor to the satisfaction of the Architect/Engineer.

D. Prime paint all field-fabricated metal work under HVAC work, comply with applicable provisions of Division 9.

1.08 IDENTIFICATION

A. *General*: Provide adequate marking of the HVAC system and control equipment to allow identification and coordination of maintenance activities and maintenance manuals. Tag and label HVAC equipment located in exposed or accessible areas to conform to ANSI A13.1-1981. After painting and/or covering is complete, identify all equipment, piping and ductwork by its abbreviated generic name as shown/scheduled/specified.

B. *Equipment*: Identify all major HVAC equipment with plastic-laminate signs of 2" high painted stencils and contrasting background. Provide test of sufficient clarity and lettering to convey adequate information at each location and mount permanently. Identify control equipment by 1-1/2" x 4" plastic laminate nameplates with 1/4" high lettering.

C. *Piping and Ductwork*: Identify all *exposed and accessible* piping and ductwork once every 30 feet at each branch, at termination of lines, and near valve or equipment connections. Place flow directional arrows at each piping or duct identification label. Provide appropriate sized letters to convey information on wrap-around siphonage, adhesive-backed or paint stenciled labels.

1. *Exposed* includes all piping and ductwork above suspended ceiling systems.

D. *Valves*: Identify all valves with 1-1/2" diameter minimum polished brass stamp-engraved or plastic laminate tags. Prefix or color-code tags for each generic piping service. Prepare and submit valve tag schedule, service and tag description, incorporate in Instruction/O&M Manual.

E. *Operational Labels*: Where needed for proper or adequate information on operation and maintenance of HVAC systems, provide labels or markers of plasticized or laminated card stock, typewritten of appropriate size to convey the information.

F. Submit schedule of Identification labels for Architect/Engineer approval.

1.09 CUTTING AND PATCHING

A. *General:* Refer to Division 1 General Requirements.

B. Perform all cutting and patching required for complete installation of the HVAC systems, unless specifically noted otherwise. Provide all materials required for patching unless otherwise noted.

1. All cutting and patching necessary of structural members to install any HVAC work shall not be done without permission, and then only carefully done under the direction of the Architect and General Contractor.

C. The Contractor shall not endanger any work of other trades by any demolition, cutting, digging or otherwise. Any cost caused by defective or ill-timed cutting and patching work shall be borne by the contractor responsible. Each contractor requiring cutting and patching shall hire men skilled in such cutting and patching to do the work.

1. All patching work in existing areas shall match existing work and restore the finish to its original condition in material, quality, texture, finish and color unless specifically noted or scheduled otherwise.

1.10 CONCRETE FOR HVAC WORK

A. *General:* Comply with pertinent provisions of Division 1 and Division 3.

B. All concrete work for equipment pads by the HVAC Contractor

C. *Concrete Equipment Pads*: For each piece of floor or ground mounted HVAC equipment as indicated on the Drawings, provide a 4" concrete housekeeping pad at a minimum of 4 inches wider than the full size of the respective equipment's base. Equipment pads are required for the following equipment:

1. Furnace units;
2. Energy recovery units;
3. Air-cooled dondensing units.

1.11 EQUIPMENT ACCESS

A. *General:* All valves, volume dampers, equipment and accessories shall be installed to permit access to equipment for maintenance, servicing or repairs. Relocation of piping, ducts or equipment to accomplish equipment access shall be completed by this Contractor at no additional cost.

B. *Location:* Provide access doors where equipment is located in chases or inaccessible locations. Access panels shall be furnished by this Contractor and installed by the specific trade responsible for the material in which the access panels are installed.

C. *Construction:* Access doors in fire-rated construction must have UL label. Access doors shall be of size to provide adequate access to equipment concealed in wall, ceiling and or furred-in spaces. Milcor or approved equal; 14 gauge steel frame and door, prime-coated, except stainless steel in areas subject to excessive moisture.

1.12 EQUIPMENT SUPPORTS

A. *General*: Provide all supporting steel and related materials not indicated on structural drawings as required for the installation of equipment and materials, including angles, channels, beams and hangers.

1. Prime coat paint all supports.
2. Turn over equipment curbs to the General Contractor for installation; structural steel supports under equipment curbs by the General Contractor.

1.13 EQUIPMENT GUARDS

A. General: Provide equipment guard over belt-driven assemblies, pump shafts, exposed fans and elsewhere, as indicated in this specification or required by code.

1. Prime coat paint all supports.

1.14 GUARANTEE

A. All material and workmanship must be new and first class in every respect; the heating, ventilating and air conditioning equipment must be turned over to the owner in complete working order and free from mechanical defects.

B. The HVAC Contractor must guarantee all labor and materials for one (1) year from the substantial completion and acceptance of the HVAC system and keep or place same in repair for said period, unless such defects are clearly the result of bad management after HVAC system was turned over to the Owner.

C. The system must be guaranteed to operate noiselessly and to the satisfaction of the Owner and to supply and exhaust quantities of air shown on the Drawings.

D. Before final acceptance of this work, the Contractor shall have the entire apparatus and system in complete and satisfactory operation and shall maintain same in satisfactory and continuous operation for a period of ten days prior to the date of acceptance; fuel to be furnished by the Owner.

E. The HVAC Contractor shall submit to the Engineer in triplicate, at the completion of his work, a certified statement, signed by a principal of the firm, stating that the system has been fully installed and is operating within the intent of the plans and specifications and that all system components have been tested and adjusted. This statement shall be submitted before the system is presented to the Owner for final inspection.

1.15 SUBMITTALS

A. Refer to Division 1 for additional submittal requirements.

B. The HVAC Contractor will be held responsible for correction of work deemed necessary by the Engineer due to proceeding with the work without shop drawings that have the Engineer's final approval.

C. Shop drawings shall include data on physical dimensions, gauges, materials of construction and capacities.

1. Incomplete drawings will be disapproved.

D. This Contractor will be responsible for all figures and dimensions shown on the shop drawings. Approval of shop drawings describing equipment that cannot fit in the space allotted does not relieve this Contractor from providing equipment that will meet the space requirements.

E. Submit electronic copies of shop drawings to the Architect/Engineer for approval with proper file identification, with complete detail for all equipment, materials, etc., to be furnished and installed for this project as follows:

1. Furnace units;
2. Condensing units and direct-expansion coils;
3. Energy recovery equipment;
4. Electric heat;
5. Diffusers, grilles, registers and louvers;
6. Insulation systems;
7. Temperature controls and wiring diagrams;
8. TAB air balance report;
9. Instructions and O&M manuals;
10. As-built drawings.

F. Submit complete temperature control wiring diagrams and description of components and their operation, prior to installing temperature control system.

G. Marked-up drawings indicated record installation as-built HVAC work.

H. Submit to the local building authority for approval: equipment cuts, O&M manuals, Installation manuals, and any UL listed assemblies employed to penetrate fire-rated assemblies.

1.16 HOUSEKEEPING AND CLEANUP

A. Periodically as work progress and/or as directed by the Architect, the Contractor shall remove waste materials from the building and leave the area of the workroom clean. Upon completion of work remove all tools, scaffolding, broken and waste materials, etc., from the site.

1.17 LUBRICATION

A. Upon completion of the work and before turning over to the Owner, clean and lubricate all bearings except sealed and permanently lubricated bearings. Use only lubricant recommended by the manufacturer.

1. The Contractor is responsible for maintaining and lubrication of all mechanical equipment under his contract until the Owner accepts the work.

1.18 INSTRUCTIONS AND MANUALS

A. Upon completion of the installation, but before final acceptance of the system, this Contractor shall instruct the Owner on the care and operation of all parts of the system.

B. Assemble two (2) complete sets of manufacturer's printed operating and maintenance instructions for all HVAC equipment and installed under this contract. Prepare in bound copies complete with index tabs. Information must include parts lists, equipment warranties, and wiring diagrams. Submit bound copies to the Architect for distribution.

1.19 AS-BUILT DRAWINGS

A. During construction maintain a set of prints showing installed as-built work for the project.

B. Upon completion of construction before final acceptance, provide a set of as-built drawings to the Architect/Engineer.

PART 2 - PRODUCTS

2.01 DUCTWORK

A. *Sheet Metal*: Furnish, install, fit and secure in place all supply, return, exhaust and vent air ducts, risers, branches, etc., as shown and detailed on plans, built of galvanized iron as hereinafter specified.

1. Sheet metal work shall be G90 galvanized and constructed according to practices recommended in the HVAC Duct Construction Standards - Metal and Flexible 1st ED. 1985, as published by SMACNA, and hereinafter specified. All duct dimensions noted on the drawings are finished inside dimensions.
2. *Ductwork Pressure-Velocity Classification*: + 2" static pressure class 2,500 FPM velocity level.
3. *Duct Sealing Requirements:* Seal Class B. Transverse and longitudinal joints.
4. Install ducts, risers, etc., as indicated on plans, making necessary changes in cross section, offsets, etc., whether or not same is specifically indicated. If ducts cannot be run as shown on drawings, install ducts between required points, subject to the approval of Engineer without additional cost to the Owner.
5. At all outlets and inlets in rooms, flange ducts for attachment of grilles. Install grilles according to manufacturer's recommendations.
6. Sheet metal work throughout shall be assembled and erected in such a manner that no vibration will occur and no noise be transmitted by the moving air due to inappropriate fitting or offsets. *All corrective measures will be determined by the Engineer at the HVAC Contractor's expense.*.
7. All duct turns shall have either an inside radius equal to the duct width or be a miter turn with turning vanes. Turning vanes shall be double wall air-foil type.
8. *Branch Take-Off Fittings*: Round branch take-off fittings shall be low-loss type fittings such as bellmouth or conical type; *no scoops or 90-degree tee fittings allowed.* Square/rectangular branch take-off fittings shall have 45-degree leading edge with 4-inch minimum depth; *no air turns or scoops allowed.*

B. *Ductwork Accessories*:

1. *Volume Dampers:* Furnish and install in branches of supply air and exhaust ducts. Substantial volume dampers to be fitted with locking devices for adjusting the air delivery. Damper blades shall not exceed 6" width.
2. *Access Panels*: Install access panels with latches and gaskets in ducts at automatic dampers, coils, fire dampers, louver plenums and other duct mounted equipment. Panels in insulated ducts must be internally insulated.
3. *Openings around Ducts*: Through walls must be filled with fiberglass, caulked and sealed with 14 gauge galvanized sheet metal angle around duct on each side of wall.

2.02 FLEXIBLE DUCT

A. Provide factory fabricated insulated low-pressure flexible duct with the following construction:

1. Zinc-coated spring steel helix with 1" thick fiberglass insulation sheathed in a seamless vapor barrier (RFK) jacket.

B. Composite assembly, including insulation and vapor barrier, meeting Class 1 requirements of flame spread rating of 25 or less and smoke developed rating of 50 or less as set forth in NFPA Bulletin 90-A, and bearing the UL label as an air duct.

2.03 INSULATION

A. *General*:

1. Provide materials complying with NFPA Bulletin 90-A, as determined by UL method NFPA 225-ASTM E84, and complying with the governing code, with flame spread rating under 25 and smoke developed rating under 50.
2. Where vapor barriers are used, provide intact and continuous throughout.
3. *Acceptable Manufacturers*:
   a. Owens/Corning Fiberglass
   b. Manville
   c. Certainteed
   d. Knauf

B. *Ductwork Liner*:

1. *Acoustic Duct Liner*: Shall be equal to Shuller Manville Permacote Linacoustic mat faced fiberglass flexible duct liner (coated); Kv= 0.25 rated up to 5000 FPM velocity and 250 F temperatures.
2. *Application Schedule:* Line galvanized ductwork with flexible duct liner on the following ductwork systems with thicknesses indicated below:

Air System	*Thickness*
Transfer ducts	1"
Return air plenum at furnace unit	1”

3. Increase all lined duct dimensions to maintain the necessary free area of the duct, as shown on the plans.

C. *External Ductwork Insulation:*

1. Insulate ductwork on exterior with fiberglass insulation and foil-reinforced kraft jacket.

2. *Concealed Ductwork*: Wrap ductwork with flexible type fiberglass insulation, operating temperature range 40 to 250 degrees F, Kv = 0.25, 3/4 PCF density, FSK aluminum foil reinforced with fiberglass scrim laminated to UL rated draft, vapor permeability less than 0.02 perms. Equal to Shuller Manville Microlite faced duct wrap insulation.
3. *Exposed Ductwork*: Wrap ductwork with semi-rigid type fiberglass insulation, operating temperature range 40 to 250 degrees F, Kv = 0.23, 3 PCF density, FSK aluminum foil reinforced with fiberglass scrim laminated to UL rated kraft, vapor permeability less than 0.02 perms. Equal to Shuller Manville 814 series Spin-Glass fiberglass duct insulation.
4. *Application Schedule:*

Air System	*Thickness*
Exhaust Ducts – Fan MD or BD to outlet	1-1/2"
Tempered Fresh Air	1-1/2"
Tempered Exhaust Air	1-1/2"
Supply Ducts	2"

2.04 VIBRATION ISOLATION

A. *General:*

1. Isolate all motor driven mechanical, unless otherwise noted, from the building structure and from the systems which they serve, to prevent equipment vibrations from being transmitted to the structure.
2. Consider equipment weight distribution to provide uniform deflections.
3. For equipment with variable speed capability, select vibration isolation devices based on the lowest speed.

B. *Manufacturers:* Products and methods of fabrication shall be as manufactured by Mason Industries, Korfund Co., Amber/Booth Co., Vibration Mounting and Controls, or Kinetics, similar to the manufacturers model listed.

C. *Performance:*

1. Select all vibration isolation devices to provide minimum 95% isolation efficiency or based on the minimum static deflection and mounting criteria listed below, whichever is greater.
2. *Vibration Isolation Schedule:*

Equipment Type	*Type of Isolation*	*Minimum Static Deflection - Inches*
Furnace Units	Type 'X' Flexible Duct Connector	¾"
ERV Fans	Type 'X' Flexible Duct Connector	¾

D. *Type X Flexible Duct Connectors:*

1. Laminated flexible sheet of cotton duct and sheet elastomeric(butly, neoprene or vinyl), reinforced with steel wire mesh where required for strength to withstand duct pressure indicated.
2. Form connectors with full-faced flanges and accordion bellows to perform as flexible isolation units.
3. Provide galvanized steel retaining rings for airtight connections with ductwork.

2.05 GRILLES, REGISTERS AND DIFFUSERS

A. Furnish grilles, registers and diffusers in the sizes, type and capacity as shown on the Drawings by the selected manufacturer or approved equal.

B. *Square Ceiling Diffusers, Round Necks*: Carnes SAFA series louvered face T-bar or surface mounted with opposed bladed damper, fixed or adjustable air pattern, and round neck collars for flex duct connections. White finish, aluminum construction.

C. *Square Ceiling Diffusers Square and Rectangular Neck*: Carnes SLRB and SLJB series perforated face for surface and T-bar mounting. Hinged faced with 51% free area. White finish with black interior finish, aluminum construction.

D. *Square and Rectangular Wall Grilles and Registers, Square and Rectangular Neck*:

1. *Steel*: Carnes model RTDA and RTAA series steel registers with adjustable face blades on supply and 45 degree set on return. Opposed blade damper on registers. White finish.
2. *Aluminum*: Carnes RWDA (3/4") and RWFA (1/2") series double deflection supply register with adjustable face blades, and RWAA and RWLA series return register with 45 degrees blade set, aluminum construction, steel dampers, where indicated. White finish.

E. Grilles, Registers and Diffusers shall be suitable and compatible with ceiling construction in which they are installed. Check architectural schedules for ceiling construction. Coordinate locations with T-bar ceiling system and lighting fixtures.

2.06 SEALED-COMBUSTION FURNACE UNITS

A. Direct vent, sealed combustion, condensing type AGA certified for use with propane gas. Minimum annual fuel utilization efficiency (A.F.U.E.) of 95% minimum. All ratings are to be certified by GAMA. All wiring shall comply with the National Electrical Code.

1. Provide 22 gauge steel casing with baked enamel finish or pre-painted galvanized steel. Insulate casing back and side panels with foil faced fiberglass insulation.
2. Construct primary heat exchanger of aluminized steel.
3. Construct secondary heat exchanger of stainless steel with aluminum fins or of polypropylene laminated steel.
4. Aluminized steel multi-port in-shot burner with hot surface or electronic spark ignition, approved for vertical or sidewall venting.
5. Two-stage gas heating.

B. AGA listed gas controls including manual main shut-off valve, double automatic gas valves for redundancy and gas pressure regulator.

C. Centrifugal type blower fan statically and dynamically balanced with multiple speed, direct drive ECM fan motor. Provide low energy induced draft blower for heat exchanger prepurge and combustion gas venting.

D. Provide unit with MERV 13 30% efficient disposable type panel air filter and external filter holding rack with hinged-gasketed cover and a maximum filter face velocity of 300 fpm.

E. Provide solid state integral control unit with all necessary controls and relays including but not limited to:

1. Pressure switch for airflow of flue products through furnace and out vent system
2. Rollout switch with manual reset to prevent overtemperature in burner area
3. Electronic flame sensor
4. Blower access safety interlock
5. Timed blower start after main burners ignite
6. Factory installed 24 v transformer for controls and thermostat
7. LED’s to indicate status and to aid in troubleshooting

F. Provide unit with matching cased "A" or “W” configuration cooling coil for upflow units, "V" configuration cooling coil for downflow units, and vertical flat face configuration cooling coil for horizontal units. Minimum 1/2" OD seamless copper tubing mechanically bonded to heavy ripple

edged aluminum fins with thermal expansion valve, holding charge and copper tube stubs for field piping.

1. Non-corrosive stainless steel or polymer drain pan with 3/4" NPT drain connection.
2. 20 gauge steel coil casing with baked enamel finish and fiberglass insulation.

G. Accessories:

1. Horizontal concentric combustion air/flue vent termination assembly.
2. MERV 13 pleated filters, supporting frame, and gasketted access doors as indicated on drawings.

H. Flue vent and CA piping: Schedule 40 CPVC and PVC, respectively.

I. Furnace Condensate Piping: Schedule 40 PVC.

J. Approved Manufacturers:

1. Carrier 59TP5A(dual stage) series or approved equal.
2. Goodman.
3. York.

2.07 EVAPORATIVE COILS

A. Evaporator Coils: Furnish direct-expansion evaporator for upflow applications. Coil shall be mounted in an insulated coil plenum with pre-painted service panels and condensate pan with drain connections. Carrier CNPVP or approved equal

1. Condensate Piping: Schedule 40 PVC or schedule 40 galvanized in traffic areas.

2.08 REFRIGERANT PIPING

A. Refrigerant Piping: Furnish factory manufactured pre-charged refrigerant piping or type L ACR soft-temper copper tubing as shown on the plans for proper connections to condenser and evaporator coils, and as recommended by manufacturer of the condenser for this application.

B. Refrigerant piping shall be cleaned, dehydrated and capped. All joints shall be ASTM B32 grade 96TS silver-lead soldered joints.

C. Insulate refrigerant suction with 1/2" flexible unicellular insulation. Armstrong, Rubatex, Hallstead, or approved equal.

2.09 AIR COOLED CONDENSING UNITS

A. General: Self-contained, packaged, factory-assembled and prewired units suitable for outdoor use consisting of cabinet, compressors, condensing coils and fans, integral sub-cooling coil, controls, liquid receiver, wind deflector, and screens.

1. Refrigerants: R-410A.
2. Minimum EER: 13.0.
3. Electrical: 240 volt, 1-phase, 60 Hertz.

B. Materials: Use corrosion-resistant materials for parts in contract with refrigerant.

1. Cabinet: Galvanized steel (14 gauge) with baked enamel finish, and removable access doors or panels with quick fasteners.
2. PVC coated steel wire condenser coil guard.

C. Compressors: Hermetically sealed, 3500 RPM, resiliently mounted compressor with positive lubrication, crankcase heater, motor overload protection, service valves, and filter-drier.

1. Modular scroll compressors.
2. Extended compressor warranty: 5 years.

D. Condenser:

1. Coil: Seamless copper tubing with aluminum fins.
2. Fans: Vertical discharge, direct-drive axial fans, resiliently mounted with guard and motor.

E. Motors: Permanently lubricated ball bearing motors with built-in current and overload protection.

F. Controls:

1. High and low pressure cut-outs for compressor, oil pressure control, anti-cycle timer 5 min. (adj.) and reset relay.
2. Accessory Controls: As scheduled on Drawings.
3. Low-ambient variable-speed condenser head pressure controls(0 deg F), where scheduled.

G. Unit Controls:

1. 115 volt 1-phase fusing and control power transformer.
2. Magnetic contactors for compressor and condenser.
3. High/low pressure cutouts.
4. Reset relay.
5. Anti-recycle compressor timer.

H. Approved Manufacturer:

1. Carrier model 24ACB3 series or approved equal.
2. Goodman.
3. York.

2.10 AIR-TO-AIR HEAT EXCHANGERS (Static Plate Enthalpy Recovery Type)

A. MANUFACTURERS:

1. RenewAire or approved equal.

B. GENERAL: Indoor draw-though energy recovery unit consisting of a static plate enthalpy heat exchanger, ventilation air supply fan and exhaust air fan, unit electrical wiring and related control wiring

C. UNIT CABINET: Cabinet shall be dual-walled constructed of 20-gauge G90 galvanized steel, insulated with minimum Rv4 foil-faced rigid insulation. The working components shall be fully accessible by a fully hinged access doors.

D. HEAT EXCHANGER CORE: Enthalpic heat exchanger core shall consist of laminar flow, fixed-media, cross-flow construction with no moving parts. Latent energy transfer shall be accomplished

by direct water vapor transfer through molecular transport. Exhaust and fresh air streams shall be separated and not mix. Heat exchanger core shall not require defrost control or condensate removal.

E. FANS: Fans shall be DWDI forward-curved, direct-driven with internal vibration isolation, if specified. Unit shall be constant volume air units operating at the specified external static pressure.

F. MOTORS: Furnish ECM motors having characteristics consistent with the torque and speed of the fans being driven. All motors shall be NEMA frames and be rated in accordance with NEMA performance standards for continuous full load performance at 40 degrees C temperature rise above ambient, with a 1.15 service factor. Motor horsepower and voltages shall be as scheduled.

G. FILTERS: Furnish 2" pleated MERV 8 filters and filter track on both entering air sides of unit. Filter rack may be integral with unit or installed independently in duct upstream of unit.

H. CONTROLS: All unit controls shall be factory wired so that only field connections are required. Unit shall provide terminal connections for fan interlock with air handling unit operation.

1. Provide 24 volt control relay-transformer for 240-volt/1-phase service.

I. ELECTRICAL: Single point power connection.

1. Electric Service: 240-volt, 1-phase.
2. Non-Fused Disconnect.

J. WARRANTY: Unit shall have 2-year warranty on all parts, excluding energy recovery core. Energy recovery core shall have a 10-year unconditional warranty.

2.11 ELECTRIC HEAT

A. General: Furnish electric heat equipment of the type and capacities as shown on the Drawings and schedules.

2.14 TEMPERATURE CONTROLS

A. This Contractor shall be responsible for all automatic electric controls for HVAC equipment as indicated on the plans and as described herein.

B. Furnish all building automation controls, single-zone unit controls, motorized dampers, thermostats, protected relays, interlocks and transformers as required; and this Contractor shall mount same in suitable control panels, occupied space, or on equipment as required or specified herein. Furnish low voltage relays as required for all fans and motors automatically controlled.

C. All temperature control wiring by HVAC Contractor. All exposed low voltage wire shall be run in EMT metal conduit per Division 16.

D. *Submittals*: HVAC Contractor shall submit for approval by Engineer complete control wiring diagram and description of components and operation prior to ordering or installing temperature control system.

E. Electrical power sources and motor connections for equipment will be provided by the Electrical Contractor. All power wiring by Electrical Contractor. Furnish necessary wiring diagrams, and be responsible for obtaining proper working installation. Furnish all starters, multi-speed switches and control apparatus.

F. *Automatic Control Dampers*: Automatic Control Dampers(ACD) required but not included with fan equipment shall be furnished by this contractor.

1. Dampers shall be opposite blade or parallel-type with blades not over 6" wide and with interlocking edges and brass or nylon bearings.
2. Dampers shall be 16 gauge galvanized iron or heavier. Outdoor dampers (exposed to ambient conditions) shall be low-leakage type with neoprene blade and edge seals.

G. *Control Damper Operators:* Provide electric motor operators for all dampers requiring operators, of the type which meet requirements of operation described in the sequence of control.

1. Acceptable Manufacturer: Belimo or approved equal.
2. Two-position, spring-return: Direct-coupled actuator, 24 VAC, spring-return, minimum torque 133in-lb(35 SF). Belimo model SF-24.

H. *Thermostats*: Single-zone Control Systems

1. Single-Zone Control System: Commercial programmable communicating thermostats with room setpoint adjustment, occupied ventilation control relay, occupied override button, LCD display and related controls.

I. *Thermostats:* Electric Heat Units

1. Integral line voltage electric heat controls provided by electric heat supplier.

J. *Relays*: Furnish necessary relays, interlock control wiring and related accessories.

2.15 SEQUENCE OF CONTROL

A. Furnace Units F-1 & 2*(Constant Volume Single-Zone with Heat Recovery):*

1. Occupied Mode: Supply fan run continuous. Minimum fresh air provided by heat recovery unit ERV-1. Space thermostat shall sequence stages of heating(2-stage) or mechanical cooling (1-stage) to maintain space temperature setpoint.
2. Unoccupied Mode: Fan and heat or cooling stages shall cycle with unoccupied thermostat setpoint to maintain space temperatures. ERV-1 is deactivated.
3. Morning Warm-up/Cool-down Mode: Upon morning warm-up/cool-down cycle, supply fan shall operate continuously with 100% return air and ERV-1 off; heat or cooling stages sequencing until return air reaches a preset warm-up or cool-down setpoint temperature.

B. Energy Recovery Ventilator ERV-1:

1. Occupied Mode: Interlock operation with Furnaces F-1 or F-2 occupied mode. Fresh air and exhaust fans shall run continuous with motorized fresh air and exhaust air dampers open.
2. Unoccupied Mode: Fresh air and exhaust fans shall be deactivated with motorized fresh air and exhaust air dampers closed.

C. Electric Heat:

1. Integral thermostat provided with unit shall cycle electric heat to maintain space temperature setpoint.

PART 3 - EXECUTION

3.01 JOB CONDITIONS

A. Examine and check conditions at the actual job site and determine facilities for delivery, storing and handling of materials and equipment.

B. Drawings show approximate locations of equipment, verify exact locations.

C. Cooperate as necessary with other trades in order that all systems in the work may be installed in the best arrangement. Coordinate as required with all other trades to share space in common areas and to provide the maximum of access to each system.

3.02 DUCTWORK INSTALLATION

A. Ducts shall be constructed, supported and installed in accordance with the latest low-pressure duct standards of SMACNA. Install all turning vanes, access doors, extractors, and accessories as indicated or specified herein.

B. Apply duct liner per manufacturer's recommendation.

1. Apply duct liner with coated-side facing air stream and secured to the sheet metal with adhesive or with mechanical clips recommended by the manufacturer.
2. All duct dimensions shall be increased to maintain the necessary free area of the duct.

C. Fabricate and install all ductwork to be air tight in accordance with SMACNA Class B, seal. Evident air leaks in the ductwork shall be sealed.

D. Seal exposed outside ductwork joints water tight with mastic sealant.

E. Install all motor operated dampers per manufacturer's instructions in accordance with control sequence intended.

F. Flexible Duct: Provide flexible duct in fully extended condition, free from sags and kinks.

1. Use only the minimum length required to make the connection.
2. Do not exceed 6' - 0" in length.
3. Where horizontal support is required, provide at least 1" wide banding material hangers at not more than 36" centers.
4. Make joints and connections with 1/2" wide positive locking straps or draw band.

3.03 INSTALLATION OF EQUIPMENT

A. Locations: Install all equipment in the locations shown on the Drawings, except where specifically otherwise approved on the job by the Owner.

1. Install all thermostats 5'-0" above finished floor.

B. All equipment, as called for on the drawings and herein specified, shall be installed in strict accordance with manufacturer's recommendations.

A. Interference: Avoid interference with structure, and with work of other trades, preserving adequate headroom and clearing all doors and passageways.

B. Inspection: Check each piece of equipment in the system for defects, verifying that all parts are properly furnished and installed, that all items function properly, and that all adjustments have been made.

C. Start-up Services: Provide factory trained start-up services for the rooftop equipment, air-air heat exchanger equipment and building automation/control equipment. Submit field reports and start-up log.

3.04 TESTING, ADJUSTING, AND BALANCING

A. Provide all necessary personnel, equipment, and services and perform all tests necessary to demonstrate the integrity of the completed installation to the approval of the Owner and Architect. The air system shall be tested, adjusted and balanced in accordance with the latest edition of the Associated Air Balance Council (AABC) Procedural Standards, NEBB or equivalent by an independent TAB Contractor. TAB work performed by the HVAC Contractor shall not be accepted.

B. Submit three (3) certified copies of the final report to Architect on applicable AABC reporting forms or equivalent for approval.

1. Air volume at supply, return and exhaust inlets and outlets;
2. Air volume at each fan/air handler unit for supply air, return/exhaust air and fresh air;
3. Static pressure drops at filter assemblies, DX coils, mixing boxes, supply and return/exhaust plenum-ducts;
4. Record fan speed, RPM, motor nameplates and amperage/voltage;
5. Measure and record supply air, return/exhaust air, fresh air and mixed air temperatures. Record entering and leaving temperatures (dry bulb and wet bulb) at all coils and heating apparatus;
6. Report all equipment model #'s and related drawing identification on the TAB report;

C. Upon completion of TAB work, mark equipment settings, including damper control levers, and similar devices to indicate final settings. Plug all holes in insulation, ductwork and housings with acceptable test plugs.

D. Eliminate noise and vibration and assure proper function of all controls, maintenance of temperature, and operation with the approved design.

3.05 CLEANING

A. Ductwork: After the ductwork has been tested and proved tight, thoroughly vacuum and clean all components of the ductwork. Remove all dirt, scale, oil and other foreign substances, which may have accumulated during the installation process.

B. Equipment: After the equipment has been started and proved operational, carefully clean all accessible parts of each piece of equipment, thoroughly removing all traces of dirt, oil, grease and other foreign substances.

3.06 LUBRICATION

A. Upon completion of the work and before turning over to the Owner, clean and lubricate all bearings except sealed and permanently lubricated bearings. Use only lubricant recommended by the manufacturer.

B. Contractor is responsible for maintaining lubrication of all mechanical equipment under his contract until the Owner accepts work.

C. Furnish a chart with each piece of equipment listed, itemizing location for lubricant required and recommended periods of lubrication. Incorporate chart in Instruction Manual.

3.07 INSTRUCTIONS

A. Instruct owner’s representative in the operation and maintenance of all mechanical systems.

B. Assemble two (2) complete sets of manufacturer's printed operating and maintenance instructions for all mechanical equipment installed under this contract. Prepare in bound copies with index tabs. Information must include parts list and wiring diagrams. Submit to Architect for presentation to the Owner.

3.08 CLOSEOUT OPERATIONS

A. Refer to Division 1 for additional project closeout requirements.

B. Closeout Equipment/System Operations: Sequence operations properly so that work of the project will not be damaged or endangered. Coordinate with seasonal requirements.

1. Operate each item of equipment and each system in a test run of appropriate duration with the Owner's operating personnel present to demonstrate sustained, satisfactory performance.
2. Adjust and correct operations as required for proper performance.
3. Clean and lubricate each system, and replace dirty filters, especially worn belts and parts and similar expandable items of the work.

C. Instruction, O&M: Instruct Owner (Owner's personnel) in the proper operation and maintenance of the HVAC systems. Train personnel in the setting and scheduling of programmable thermostats for occupied/unoccupied periods.

D. Service Organization: At time of substantial completion, Contractor shall provide Owner with a listing of qualified service organizations (including addresses and telephone numbers) for each piece of major equipment.

E. Turn-Over of Operations: At time of substantial completion, turn over the prime responsibility for operation of HVAC equipment and systems to the Owner's operating personnel. However, during the guarantee period, provide and operating engineer, who is completely familiar with work, to consult with and continue training the Owner's personnel on an as-needed basis.

END OF SECTION

SECTION 26 00 00

ELECTRICAL

PART 1 - GENERAL

1.01 DESCRIPTION

A. *Work Included:* Provide complete electrical service and distribution system with equipment and materials where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:

1. New electrical distribution equipment;
2. Grounding and Bonding;
3. Branch circuit wiring, for lighting, receptacles, motors and equipment;
4. Wiring devices and related equipment;
5. Lighting fixtures and lamps;
6. Lighting Control Systems;
7. Trenching and backfilling for new underground electrical utilities by the Electrical
8. Hangers, anchor sleeves, chase supports for fixtures, and other electrical materials and equipment in association therewith;
9. Other items and services required to complete the electrical systems.
10. Furnish solar photovoltaic system per specification 26 31 00.

B. *Related Work:*

1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications;
2. Refer to Division 00 project bidding requirements for alternates and related requirements.

C. *Work of Other Sections:*

1. Low-voltage (less than 100 volts) controls for General Construction, Plumbing, and HVAC trades.
2. Voice/data cabling and terminations by the Owners Vendor.

1.02 GENERAL PROVISIONS

A. Everything essential for the completion of the work implied to be covered by these Specifications to make the system ready for normal and proper operation must be furnished and installed by this Contractor. Accordingly, any omission from either the plans or the Specifications, or both, of details necessary for the proper installation and operation of the system shall not relieve this Contractor from furnishing such detail in full and proper manner.

B. In addition to the electrical plans, see General Plans of the building, as all electrical work appearing on the latter plans will be part of this contract unless especially specified to be done by other contractors, as well as, the said work detailed on the electrical plans.

1.03 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.

B. Without additional cost to the Owner, provide such other labor and materials as required to complete the work of this Section in accordance with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these Contract Documents.

C. *Reference Standard:* The following standards are imposed, as applicable to the work:

ASTM	American Society of Testing and Materials
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
UL	Underwriters Laboratories
UL 50	Standards for enclosures for electrical equipment
UL 67	Standards for panelboards
UL 489	Standards for molded-case circuit breakers
NEMA AB 1	Standards for molded case circuit breakers
NEMA PB 1	Standards for panelboards

1.04 CODES AND PERMITS

A. The Contractor must comply with national, state of Wisconsin and electrical codes and other ordinances in force where the building is located as far as same apply to his work.

1. IBC 2009;
2. IEEC 2009;
3. NEC 2008;
4. Wisconsin Electrical Code SPS sections.

B. He must secure permits from proper offices and pay fees as may be necessary for fulfilling the requirements of these Specifications.

C. One (1) copy of all permits must be furnished to the Owner.

1.05 COORDINATION

A. Cooperate and coordinate with other trades to assure that all systems in the electrical work may be installed in the best arrangement. Coordinate as required with all other trades to share space in common areas and to provide the maximum of access to each system.

B. Arrange electrical work in neat, well-organized manner with piping and similar running parallel with primary lines of building construction.

C. Locate operating and control equipment properly to provide easy access, and install entire electrical systems with adequate access for operation and maintenance.

D. Give right-of-way to piping which must slope for drainage.

1.06 ELECTRICAL PROVISIONS OF THE MECHANICAL WORK

A. Line Voltage Wiring: The Electrical Contractor shall make all line voltage (100 volts and greater) electrical wiring, final connections and motor wiring for Mechanical equipment.

B. Control Wiring: Low-voltage (less than 100 volts) control wiring in conjunction with Mechanical work shall be by the Mechanical Contractor in strict accordance with the applicable sections of the Electrical Specifications.

C. Motors, Starters, and Disconnects: All motors starter and disconnects shall be provided by the Electrical Contractor, unless provided with the equipment or indicated otherwise.

1. Mechanical Contractors shall furnish list of and location of all Mechanical equipment and requirements for electrical connections, along with wiring diagrams.

1.07 FLOOR, WALL, ROOF AND CEILING OPENINGS

A. The General Contractor will be required to leave openings in new construction ceiling, floors, walls, roof, partitions, etc., as required to install the Electrical work specified or shown on the Drawings. The Electrical Contractor is responsible for correct size and location of openings.

B. Provisions for openings, holes and clearances through new construction walls, floors, ceilings and partitions are to be made in advance of construction of such parts of the building.

C The Electrical Contractor shall set sleeves and anchors for all equipment, etc., and shall provide watertight seals on pipes through exterior walls, floors and roof locations, and where noted on the Drawings.

D. Pack annular space between sleeves and conduit with fiberglass insulation and seal with caulk. Where penetrations through fire rated walls or floors, seal openings with UL approved fire-stopping sealant/caulk assembly.

1.08 CUTTING AND PATCHING

A. *General:* Refer to Division 1 General Requirements.

B. Perform all cutting and patching required for complete installation of the Electrical systems, unless specifically noted otherwise. Provide all materials required for patching unless otherwise noted.

1. All cutting and patching necessary of structural members to install any Electrical work shall not be done without permission, and then only carefully done under the direction of the Architect and General Contractor.

C. The Contractor shall not endanger any work of other trades by demolition, cutting, digging or otherwise. Any cost caused by defective or ill-timed cutting and patching work shall be borne by the contractor responsible. Each contractor requiring cutting and patching shall hire men skilled in such cutting and patching to do the work.

1. All patching work in existing areas shall match existing work in material, quality, texture, finish and color unless specifically noted or scheduled otherwise.

1.09 TRENCHING AND BACKFILLING

A. Comply with pertinent provisions of Division 1.

B. Perform trenching and backfilling associated with the work of this Section in strict accordance with the provisions of Division 2 of the Specifications.

1.10 SUBMITTALS

A. Comply with pertinent provisions of Division 1.

B. *Shop Drawing Submittals*: Submit electronic shop drawings to the Architect for approval, with complete detail for all equipment, materials, etc., to be furnished and installed for this project as follows:

1. Light Fixtures.
2. Electrical Devices.
3. Lighting Controls.
4. Electric Distribution Equipment.
5. Electrical Boxes and Raceways.

C. *Shop Drawings*:

1. The Electrical Contractor will be held responsible for correction of work deemed necessary by the Engineer due to proceeding with the electrical work without approved shop drawings that have the Architect/Engineers final approval.
2. Shop drawings shall include data on physical dimensions, gauges, materials of construction and capacities. Incomplete drawings will be disapproved.
3. This Contractor will be responsible for all figures, quantities and dimensions shown on the shop drawings.
4. Approval of shop drawings describing equipment that cannot fit in the space allotted does not relieve this Contractor from responsibility of resubmitting equipment that will meet the space requirements.

D. *O & M Manual*: Upon completion of this portion of the Work, and as a condition of its acceptance, deliver to the Architect two (2) copies of an operation and maintenance manual compiled in accordance with the provisions of Division 1 of these Specifications. Include the following within the bound O&M manual:

1. Copy of the approved Record Documents for this portion of the Work;
2. Copies of all circuit directories;
3. Copies of all warranties and guaranties.
4. As-built drawings.

E. *As-built Drawings:* Record installation as-built on a set of drawings prints in red during construction. Plan shall represent actual locations, materials and circuiting of equipment installed.

1.11 PRODUCT HANDLING

A. Comply with pertinent provisions of Division 1.

1.12 WARRANTY

A. In addition to standard one year warranty on all labor and materials, provide an additional warranty on ballasts for all new fluorescent and HID lighting fixtures as specified.

1.13 HOUSEKEEPING AND CLEAN-UP

A. Periodically as work progresses and/or as directed by the Architect, the Contractor shall remove waste materials from the building and leave the area of the workroom clean. Upon completion of work remove all tools, scaffolding, broken and waste materials, etc., from the site.

1.14 TEMPORARY SERVICES

A. This Contractor shall provide temporary lighting and power as required throughout the construction period.

B. Arrange for temporary electrical utility with local electrical utility. Electrical Contractor shall pay all temporary electrical service and usage fees.

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide only materials that are new, of the type and quality specified. Where Underwriters' Laboratories, Inc. have established standards for such materials, provide only materials bearing the UL label.

2.02 BEDDING AND COVER MATERIAL

A. Bedding and cover material shall be approved bedding sand with 100% of material passing a 3/8" sieve. No native material from trench shall be used for bedding or cover material. Unwashed bank run sand and crushed bank run gravel will be considered generally acceptable cover material.

2.03 BACKFILL MATERIALS

A. Contractor shall backfill and compact trenches outside structure and structures zone of influence (ZOI) with excavated material, as long as it is free of cinders, ashes, refuse, rocks, boulders, or other such unsuitable materials and in the opinion of the Engineer is considered suitable.

B. Contractor shall backfill and compact trenches within structure and structures ZOI with Low Frost Susceptibility Granular Fill consisting of granular material having less than 5 percent pass ing a No. 200 U.S. standard sieve or ¾ inch clear stone.

2.04 SERVICE ENTRANCES AND METERING

A. Electric Service:

1. Existing underground 200A, 120/240 volt, 1-phase, 3-wire electric service will be reused.

B. Metering: Existing to be reused.

C. Main Service Switches:

1. Existing 200-amp main circuit breaker in Panel A to be reused.

D. Distribution Panels:

1. Panel ‘A’: Existing 200-amp, 1-phase main distribution panel to be reused as indicated on plans.

2.05 GROUNDING SYSTEM

A. Ground all equipment, including switches, transformers, conduit systems, motors, and other apparatus, by conduit or conductor to cold water main and to independent electrode, using ground clamps manufactured by Burndy or T&B, and approved by the Engineer.

B. Existing service ground to be reused.

C. Provide grounding jumper from electrical devices to the metallic device boxes.

D. GFI receptacles shall be provided with separate insulated ground wire conductor to the main service or distribution panelboard ground bar.

E. Ground all motor and equipment connections with dedicated ground conductor.

2.06 IDENTIFICATION

A. Junction and pull boxes shall be stenciled utilizing a coded identification system. The following junction and pull boxes shall be identified using a coded system. Coding shall be submitted to Engineer for approval.

1. Light and Power - 120/240V.

B. Label circuit numbers for all accessible line voltage power distribution raceways and junction boxes.

C. Laminated Bakelite Plates: Engraved plastic nameplate shall be securely fastened to the following equipment. Size 1" x 4" with 3/8" high letters unless space available dictates differently.

1. Each section of main distribution switchboards and panelboards. Mount one next to each protection device to identify load served by each circuit breaker.

D. Typewritten Directory: Each panelboard shall be provided with a typewritten directory in a steel frame with plastic cover contained on the inside of panel door. These directories shall indicate load served and rooms served by each protective device in the respective panel.

E. Identify all conductors per NEC:

120/240V -Phase A - Black
-Phase B - Red
-Neutral - White
-Ground - Green

F. Label all receptacle plates with self-adhesive clear labeling tape and black letters indicating panel # and circuit # serving device.

2.07 WIRING DEVICES

A. *General*:

1. Devices shall be provided at each location shown on the plans or called for in the Specifications.

2. All devices shall be of one manufacturer. Acceptable manufacturers: Leviton, Pass and Seymour, Hubbell or General Electric.
3. Device catalog references herein and on the plans are to be considered as standards of comparison. Comparable devices manufactured by the other manufacturer will be considered as an optional choice.
4. Device finish color to be selected by Architect.

B. *Receptacles*:

1. Duplex Receptacles: Industrial-specification grade, nylon face and base, NEMA 5-15R, 15A, tamperproof, side-wired only, 3-wire grounding type with the third terminal U-shaped and grounded to the conduit system or green wire ground. Use of self-grounding option not permitted.
   a. 15-amp: Leviton 5262;
   b. 20-amp: Leviton 5362;
2. GFCI Receptacle: Industrial-specification grade, NEMA 5-15R or 20R with indicator light and feed through. Provide tamper resistant devices in public areas.
   a. 15-amp: Leviton 7599; tamper resistant: Leviton T7599
   b. 20-amp: Leviton 7899; tamper resistant: Leviton T7899

C. *Switches:*

1. All toggle switches used to control lighting shall be 20 amp rated for 120/277 volts, A.C., industrial-specification grade.
2. 15 amp switches shall not to be used unless specifically shown otherwise for special control.
3. Switches to be back and side wired, silent or quiet type.
4. The following catalog numbers refer to Leviton, Inc.:
   a. single pole – 1221-2;
   b. three way – 1223-2;
   c. four way – 1224-2;
   d. Single pole with pilot light – 1221-PLR;

D. *Plates*:

1. Provide as required for each outlet, single or multiple gang.
2. Provide blank covers on all empty boxes or outlets.
3. Plates shall be 204 stainless steel or nylon construction in all finished areas; Architect to select final plate construction.
4. Galvanized steel box covers shall be used in unfinished areas. Cover shall be 1/2" raised with no sharp edges.
5. Provide single gang die-cast weather resistant in-use covers equal to Leviton M5979 on receptacles in damp areas and exterior locations.

A. *General*:

1. Devices shall be provided at each location shown on the plans or called for in the Specifications.
2. All devices shall be of one manufacturer. Acceptable manufacturers: Leviton, Pass and Seymour or Hubbell.
3. Device catalog references herein and on the plans are to be considered as standards of comparison. Comparable devices manufactured by the other manufacturer will be considered as an optional choice.

B. *Receptacles*:

3. Duplex Receptacles: Industrial-specification grade, nylon face and base, ivory color, side-wired only, 3-wire grounding type with the third terminal U-shaped and grounded to the conduit system or green wire ground. Use of self-grounding option not permitted.
4. NEMA 5-15R, 15A - Leviton 5262A.
5. NEMA 5-20R, 20A - Leviton 5362A.
6. NEMA 5-15R, 15A GFCI Receptacle: Specification grade with lock-out action, indicator light and feed through. Equal to Leviton 8598-HG.

C. *Switches:*

1. All toggle switches used to control lighting shall be 20 amp rated for 120/277 volts, A.C., industrial-specification grade ivory color.
2. 15 amp switches shall not to be used unless specifically shown otherwise for special control.
3. Switches to be back and side wired, silent or quiet type.
4. The following catalog numbers refer to Leviton, Inc.:
   a. single pole – 1221-2I
   b. three way – 1223-2
   c. four way – 1224-2
   d. Single pole with pilot light – 1221-PLR (red)

D. *Plates*:

1. Provide as required for each outlet, single or multiple gang.
2. Provide blank covers on all empty boxes or outlets.
3. Plates shall be 204 stainless steel or nylon construction in all finished areas; confirm Owner's preference prior to ordering.
4. Galvanized steel box covers shall be used in unfinished areas. Cover shall be 1/2" raised with no sharp edges.
5. Provide single-gang die-cast or impact resistant thermoplastic covers and gasketted bases NEMA-3R rated “while-in-use” equal to Leviton 5976-GY (vertical) or 5996-GY(horizontal) on receptacles in damp or exterior locations.

2.08 RACEWAY SYSTEM

A. *Steel Conduit*: Galvanized or sheradized steel intermediate (IMC) or rigid metal conduit (RMC), or electrical metallic tubing (EMT) with steel compression ring or steel set screw type fittings.

1. Provide steel conduits concealed in the walls, above the ceilings, or exposed in the work areas.
2. Indented or cast fittings are not acceptable.
3. Where conduit is installed underground or in the floor slab, provide rigid galvanized steel (RMC) conduit with PVC interior coating or PVC coated steel conduit.
4. Provide liquid-tight rigid metal conduit (RMC) or Intermediate metal conduit (IMC) at exterior locations above grade.

B. *Rigid Non-Metallic Conduit*: Schedule 80 PVC with solvent welded fittings.

1. Below grade installation only.
2. Encase in concrete below drives and roadways.
3. ENT flexible non-metallic conduit may be used in concealed masonry areas above grade.

C. *Outlets, Junction Boxes and Switch Boxes*:

1. Provide standard one-piece units, galvanized or sheradized, of shape and size best suited to that particular location, of sufficient size to contain enclosed wires without crowding.
2. Provide deep boxes with 1" and larger conduit.
3. For lighting outlets, provide standard 4" octagon or square units, with 3/8" malleable iron fixture studs and box hangers where required.
4. For switches and receptacles, provide boxes 4" square by 1-1/2" deep minimum with rings and covers as required.
5. Provide cast liquid-tight boxes with gaskets at exterior locations.

D. For pull boxes, provide galvanized code-gauge sheet units with screw-on covers, of size and shape required to accommodate wires without crowding and to suit the location.

E. Provide sleeves and chases where conduits pass through floors and walls.

F. Handhold Splice Boxes: Provide flush at grade splice boxes constructed of fiberglass polymer concrete reinforced with removable access cover labeled “ELECTRIC” and stainless steel cover fasteners. Cover shall be cast iron, bronze or fiberglass polymer UV rated.

1. Highline CHA101512 (10”x15”x12”high) or approved equal.
2. Cover assembly shall be load tested per ANSI/SCTE 77 for 12,000 lbs.
3. Mount splice box on 6” compacted gravel base and pour 6” concrete collar (4”deep) around top for protection.

2.09 CONDUCTORS

A. *Wire and Cable (600 Volt):* Provide 600 V insulated copper wire and cable, NEC standard, of types specified below for different applications, with UL label, and color coded as required by governmental agencies having jurisdiction. Use only copper wires and cables.

1. With conductors No. 4 and larger, provide insulating bushings.
2. Interior wire and cable shall be THHN or THWN.
3. Exterior wire and cable shall be XHHW-2.
4. Wire No. 10 and smaller shall be solid or stranded wire; wire larger than No. 10 shall be stranded wire.
5. Wire in conduits subjected to direct sunlight shall be THWN or XHWN.
6. Identify feeder neutrals with white tape or white paint.

B. *Armored Cable (AC) or Metal-Clad Cable (MC):*

1. Limit AC and MC usage to concealed only locations, branch-circuit wiring after the first junction box from the panelboards; where approved by NEC, state and local electrical inspecting authorities.
2. Not allowed for Panelboard feeders or service conduit.
3. Provide and install per NEC Articles 333 and 334 with grounding conductor.

C. Below grade conductor splices:

1. Compression type inline splice connectors, watertight assembly, dual rated AL9CU for stranded copper or aluminum conductors.
2. UL 486B listed.
3. Burndy “UNITAP” BISR, BIBD or BISR series or approved equal.

2.10 MOTOR WIRING

A. See plans for approximate location and sizes of all motors. Verify exact locations at job site with the contractor that is furnishing the motor driven equipment.

B. The Drawing motor schedules indicate that the anticipated horsepower loads and circuit sizes. Verify all these requirements with contractor concerned and install accordingly under this contract.

C. Install disconnect means where required by code for motors out of sight of controller. These shall be fusible safety switches, fusetron box cover unit, or non-fused switch as indicated on plans. All switches shall be horsepower rated.

D. All motors will be furnished and installed by others, unless noted otherwise.

E. Motor starters to be provided and installed by the Electrical Contractor unless indicated otherwise herein or on the plans. See Motor Schedule.

F. All final connections to motors to be made by this Contractor.

G. All motors to be connected using flexible metallic conduits extending from motor box to outlet box. Use liquid tight flexible metallic conduit with PVC covering in wet or oily locations and for all motors within 12" of floor. See paragraph on GROUNDING. All wires in flexible metallic conduit shall be stranded. Grounding wires shall be in all cases installed in flexible conduit and not wrapped around the outside of the conduit.

2.11 MOTOR STARTERS

A. General:

1. Indoor - NEMA Type 1.
2. Outdoors or where exposed to moisture - NEMA Type 3R, raintight.
3. Units shall open all ungrounded conductors simultaneously.
4. All starters shall be from a single manufacturer.
5. Approved Manufacturers: Square D.

B. Manual Starters:

1. For single-phase starters, provide units of tumbler switch type that clearly indicate ON, OFF and TRIPPED positions.
2. For three-phase starters, provide pushbutton operated units with START, STOP-RESET button on the enclosure cover.

C. Magnetic Starters:

1. Provide units with operating coils designed to operate on line voltage or any other auxiliary voltage indicated on the Drawings.
2. For starters with line voltage operating coils, provide built-in under-voltage release.
3. Provide units with the accessories and auxiliary contacts needed for automatic or remote operation as shown on the Drawings.
4. Provide "H-O-A" control switch and "green" run light on unit cover.
5. Provide thermal overload protection in each phase which if any phase trips causes the starter to drop out.

2.12 SAFETY SWITCHES

A. Provide safety switches of general duty type, horsepower rated, quick-make and quick-break design, externally operated with provision for padlocking, fusible or non-fusible as shown on the Drawings.

B. Provide enclosures clearly marked for maximum voltage, current, and horsepower rating, and:

1. Indoor: NEMA type 1.
2. Outdoor: NEMA type 3R, raintight.

C. Approved Manufacturers: Square D.

2.13 LIGHTING FIXTURES

A. Provide fixtures of the types shown on the Drawings, and with the following accessories as applicable.

B. *Light Fixtures*:

1. Provide fixtures having a UL label.
2. Provide local label in addition if so required by governmental agencies having jurisdiction.
3. Verify all ceiling types as shown on final architectural plans and be responsible for ordering proper fixtures and accessories for the proper ceiling.

C. *LED Lighting:*

1. The manufacturer of the LED lighting fixture shall utilize high-brightness LEDs and high-efficiency electronic LED drivers, dimmed or no dimmed as required.
2. The LED fixture shall be thermally designed as to not exceed the maximum junction temperature of the LED for the ambient temperature of the location the fixture is to be installed
3. Light output of the LED system shall be the absolute photometry following IESNA LM-79 and IESNA LM-80 requirements and guidelines.
4. Minimum power factor of 0.90.
5. LED lighting fixture shall be mercury-free, lead-free and RoHS compliant.
6. The LED lighting fixture shall maintain 70% lumen output for a minimum of 50,000 hours.
7. All components of the LED lighting fixture shall be replaceable.
8. The LED lighting fixture shall carry a limited 3-year warranty minimum.

D. *Acceptable Lighting Fixture Manufacturers*:

1. Refer to Fixture Schedule. Engineer will evaluate and make final decision on whether submitted fixture is equal to specified light fixture.

2.14 OCCUPANCY SENSOR CONTROLS

A. Occupancy Sensors shall be equal to Sensor Switch or approved equal. Refer to Occupancy Sensor schedule on the Drawings for specific types required.

1. All sensors shall be capable of operating normally with electronic fluorescent ballasts and LED driver systems and rated motor loads.
2. Coverage of sensors shall remain constant after sensitivity control has been set. No automatic reduction shall occur in coverage due to the cycling of air conditioner or heating fans.
3. All sensors shall have readily accessible, user adjustable settings for time delay and sensitivity. Settings shall be located on the sensor (not the control unit) and shall be recessed to limit tampering.

4. All sensors shall provide an LED as a visual means of indication at all times to verify that motion is being detected during both testing and normal operation.

B. Wall Sensors:

1. Wall switch sensors shall be capable of detection of occupancy at desktop level up to 300 square feet, and gross motion up to 1000 square feet.
2. Wall switch sensors shall accommodate loads from 0 to 800 watts at 120 volts; 0 to 1200 watts at 277 volts and shall have 180° coverage capability.
3. Wall switch sensors shall have no leakage current to load, in manual or in Auto/Off mode for safety purposes and shall have voltage drop protection.
4. Wall switch sensors shall provide a field selectable option to convert sensor operation from automatic-ON to manual-ON.

C. Passive Infrared Sensors:

1. Passive infrared sensors shall utilize Pulse Count Processing and Digital Signature Analysis to respond only to those signals caused by human motion.
2. Passive infrared sensors shall utilize mixed signal ASIC which provides high immunity to false triggering from RFI (hand-held radios) and EMI (electrical noise on the line), superior performance, and greater reliability.

D. Ultrasonic Sensors:

1. Ultrasonic sensors shall utilize Advanced Signal Processing to adjust the detection threshold dynamically to compensate for constantly changing levels of activity and air flow throughout controlled space.
2. Ultrasonic operating frequency shall be crystal controlled at 25 kHz within ± 0.005% tolerance, 32 kHz within ± 0.002% tolerance, or 40 kHz ± 0.002% tolerance to assure reliable performance and eliminate sensor cross-talk. Sensors using multiple frequencies are not acceptable.

E. Dual Technology Sensors:

1. Dual technology sensors shall be corner mounted to avoid detection outside the controlled area when doors are left open.
2. Dual technology sensors shall consist of passive infrared and ultrasonic technologies for occupancy detection. Products that react to noise or ambient sound shall not be considered.

2.15 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

PART 3 - EXECUTION

3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.02 PREPARATION

A. *Coordination*:

1. Coordinate as necessary with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
2. Coordinate the installation of electrical items with the schedule for work of other trades to prevent unnecessary delays in the total Work.
3. Where lighting fixtures and other electrical items are shown in conflict with locations of structural members and mechanical or other equipment, provide required supports and wiring to clear the encroachment.

B. Data indicated on the Drawings and in these Specifications are as exact as could be secured, but their absolute accuracy is not warranted. The exact locations, distances, levels, and other conditions will be governed by actual construction and the Drawings and Specifications should be used only for guidance in such regard.

C. Where outlets are not specifically located on the Drawings, locate as determined in the field by the Architect. Where outlets are installed without such specific direction, relocate as directed by the Architect and at no additional cost to the Owner.

D. Verify all measurements at the building. No extra compensation will be allowed because of differences between work shown on the drawings and actual measurements at the site of construction.

E. The Electrical Drawings are diagrammatic, but are required to be followed closely as actual construction and work of other trades will permit. Where deviations are required to conform with actual construction and the work of other trades, make such deviations without additional cost to the Owner.

3.03 TRENCHING AND BACKFILLING

A. Perform trenching and backfilling associated with the work of this Section in strict accordance with the provisions of Division 2 of these Specifications.

B. Cut bottom of trench to grade, make trench 12” wider than the widest dimension of the pipe.

C. *Bedding*:

1. Do not start backfill operations until underground plumbing work has been properly inspected and approved by governing authorities.
2. Provide four (4) inches of bedding and six (6) inches of cover over all underground conduits.

D. *Backfilling:*

1. Disturbed areas outside of structure shall be returned to existing grade with six (6) inches of topsoil.
2. Compaction of backfill material outside the structure and structure’s ZOI shall meet 90% Modified Proctor, the standard specification of ASTM D-1557.
3. Compaction of Low Frost Susceptibility Granular Fill within the structure and structures ZOI shall meet 95% Modified Proctor, the standard specification or ASTM D-1557.

3.04 INSTALLATION OF RACEWAYS AND FITTINGS

A. Where conduit is installed concealed in walls or above ceiling, or exposed in work areas, provide rigid galvanized conduit or electrical metallic tubing with compression type fittings.

1. Seal joints to prevent entrance of water.
2. Provide ground wire of proper size per NEC 250.
3. Use nylon (rather than steel) fish tape.

B. Use flexible conduit only for short motor connections, or where subject to vibration.

C. Provide necessary sleeves and chases where conduits pass through floors and walls and provide other necessary openings and spaces, arranging for proper time to prevent unnecessary cutting in connection with the Work.

D. Where conduit is exposed, run parallel to or at right angle with lines of the building.

E. Securely and rigidly support conduits throughout the work.

3.05 INSTALLATION OF CONDUIT

A. Provide for the proper application, installation and location of inserts, supports and anchor bolts, for a satisfactory raceway system. Replace any damaged components of the raceway system.

B. Run conduits concealed. Conduits may be exposed only when it is impossible or impractical to conceal. Mechanical rooms may use exposed conduit.

C. All conduits that protrude through slabs shall be PVC coated rigid conduit.

D. Conduit seals shall be provided where conduits pass from interior walls to exterior walls in accordance with NEC.

E. All conduits installed below grade shall be buried a minimum of 2 feet.

3.06 INSTALLATION OF OUTLETS, LIGHT SWITCHES, AND PULL AND JUNCTION BOXES

A. Outlets and light switch timers shall be installed at the locations and heights indicated on the Drawings.

B. Pull and junction boxes shall be located in accessible locations as approved by Engineer.

C. Outlets, light switches, and pull and junction boxes shall be supported independently from conduit.

D. All outlets, light switches, and pull and junction boxes shall be recessed; secure boxes to walls to provide for flush cover finish.

3.07 INSTALLATION OF LIGHTING FIXTURES

A. Install lighting fixtures complete and ready for service in accordance with the Lighting Fixture Schedule shown on the Drawings.

B. Wire fixtures with fixture wiring of at least 90 degrees C rating. Where fixtures are mounted in continuous rows, provide conductors in wiring channels of the same size as the circuit wires supplying the row of fixtures.

C. Use only bonderized, galvanized, or sheradized steel for fixture installation for protection against rust and corrosion, and install fluorescent fixtures straight and true with reference to walls.

D. Install all lighting fixtures, including those mounted in continuous rows, so that the weight of the fixture is supported, either directly or indirectly, by a safe and sound structural member of the building, using adequate number and type of fastenings to assure safe installation.

1. Screwed fastenings, and toggle bolts through ceiling material or wall paneling, are not acceptable.
2. Install T-bar hold-down clips on all light fixtures.

3.08 INSTALLATION OF POWER EQUIPMENT

A. Provide power and control wiring for motor starters and safety switches as shown on the Drawings.

3.09 INSTALLATION OF CONDUCTORS

A. Unless otherwise shown on the Drawings or noted in these Specifications, use No. 12 AWG conductors for all branch circuits, protected by 20 amp circuit breakers. For runs exceeding 100 feet, use larger wires to limit voltage drops.

B. Use identified (white) neutrals and color-coded phase wires for all branch circuit wiring.

1. Make splices electrically and mechanically secure with pressure-type connectors.
2. Provide "Scotchlok", Buchanon "B-cap", or Ideal "Wing-nut" connectors for wires sizes 6 AWG and smaller.
3. Provide Burndy compression-type connectors, "Hydent" or equal applied with a mechanical tool and die equipment for wire sizes 4 AWG and larger.
4. Insulate splices with a minimum of two half-lapped layers of Scotch Branch No. 33 vinyl-plastic electrical tape where insulation is required.

3.10 TESTING AND INSPECTION

A. Provide personnel and equipment, make required tests, and secure required approvals from the Architect and governmental agencies having jurisdiction.

B. Make written notice to the Architect adequately in advance of each of the following stages of construction:

1. Test all parts of the electrical system and prove that all such items provided under this Section function electrically in the required manner.
2. Immediately submit to the Architect a report of maximum and minimum voltages and a copy of the recording volt-meter chart.
3. Also measure voltages between phases and between phase wires and neutrals and report these voltages to the Architect.

3.11 PROJECT COMPLETION

A. Upon completion of the work of this Section, thoroughly clean all exposed portions of the electrical installation, removing all traces of soil, labels, grease, oil, and other foreign material, and using only the type cleaner recommended by the manufacturer of the item being cleaned.

B. Thoroughly indoctrinate the Owner's operation and maintenance personnel in the contents of the operations and maintenance manual required to be submitted under Article 1.3 of this Section of these Specifications.

END OF SECTION

SECTION 26 31 00

SOLAR PHOTOVOLTAIC SYSTEMS

PART 1 - GENERAL

1.1 SCOPE

A. The work under this section includes Photovoltaic (PV) system as indicated on the project drawings and electrical diagrams.

B. This section specifies the final design, furnishing and installation, connection and testing of the Photovoltaic system. The Photovoltaic system shall includes PV modules mounted in an array, micro-inverters, mounting supports and related balance of system components.

1. The balance of system components include wiring, conduit, combiner boxes, disconnects over-current protection, surge suppression and grounding equipment.
2. Provide remote LED screen secured to wall in Lobby 100 for display of photovoltaic performance parameters indicating current power output (KW), daily production (KWH), monthly production(KWH) and year to date production(KWH) along with relevant carbon footprint savings. Provide information in a graphic format for educational purposes.

C. The PV system described in this document shall be of the grid-connected type based on a 3.4 KW solar photovoltaic capacity with central inverter mounted on an aluminum support system secured to wood roof trusses under a metal raised-seam roof system.

D. The PV system shall supply 3.4 KW of AC power to a utility net meter and shall immediately disconnect from the grid upon loss of grid power to the service as per IEEE and local utility (MG&E) regulations.

E. The Electrical Contractor shall be responsible for electrical tie in of the PV System to the utility metering as indicated on the Drawings.

F. The Electrical Contractor shall be responsible for preparing and completing PSC 119 application for distributed generation PV system less than 20 KW and coordinate with the electrical utility (Alliant Energy).

G. The Electrical Contractor shall also, prepare application for Focus-On-Energy Renewable Energy grants, when available.

1.2 RELATED WORK

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

B. Section 26 00 00 - ELECTRICAL

1.3 REFERENCE STANDARDS

A.	NFPA 70, NEC Article 690	Solar Photovoltaic System
B	Wisconsin SPS 371	Solar Energy Systems
C.	Wisconsin SPS 318	Electrical

D.	IEEE	
	IEEE 519	Recommended Practices And Requirements For Harmonic Control In Electrical Power
	IEEE 929	Recommended Practice for Utility Interface of Residential and Intermediate Photovoltaic (PV)
	IEEE 1262	Recommended practice for Qualifications of Photovoltaic Modules
	IEEE 1547	IEEE Standard for Interconnecting Distributed Resources with Electric Power Systems
E.	ASTM E 1328	Standard Terminology Relating to Photovoltaic Solar Energy Conversion.
F.	Underwriters Laboratories, Inc. (UL):	
	UL	
	UL 790	Standard Test Methods for Fire Tests of Roof Coverings.
	UL 1703	Standard for Flat-Plate Photovoltaic Modules and Panels.
	UL 1741	Standard for Inverters, Converters, and Controllers for Use in Independent Power Systems.
G.	ANSI/UL 1703	Standard for Flat-Plate Photovoltaic Modules and Panels.
H.	IEC	
	IEC 61215	International Standard (Extended Version) - Crystalline silicon terrestrial photovoltaic (PV) modules - Design qualification and type approval.
	IEC 61730-1	International Standard - Photovoltaic (PV) module safety qualification - Part 1 - Requirements for construction.
	IEC 61730-2	International Standard - Photovoltaic (PV) module safety qualification - Part 2 - Requirements for testing.
I.	ISO	
	ISO 9001	Quality Management Systems.
	ISO 14001	Environmental Management Systems.
J.	WI PSC Chapter 119	Rules for Interconnecting Distributed Generation Facilities

Definitions:

NOCT = Normal operation cell temperature.

STC = Values of standard test conditions.

1.4 QUALITY ASSURANCE

A. MANUFACTURER: Having 5 years experience manufacturing components similar to or exceeding requirements of project.

B. Having sufficient capacity to produce and deliver required materials without causing delay in work.

C. Capable of providing field service representation during construction.

D. Manufacturing facility certified to ISO 9001 and to ISO 14001.

1.5 INSTALLER:

A. Acceptable to the manufacturer, 3 years experienced in performing work of this section and has specialized in installation of work similar or larger to that required for this project.

B. PV work shall be supervised by a licensed electrical contractor.

C. North American Board of Certified Energy Practitioners (NABCEP) PV installer or equivalent training approved by the Engineer.

1.5 WARRANTY

A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and does not limit, other rights Owner may have under other Contract Documents.

B. PV Modules:
1. During the first ten (10) years from the date of sale, produce at least 92% of the minimum power output rating.
2. During the first twenty (20) years from the date of sale, produce at least 84% of the minimum power output rating.
3. During twenty-five (25) years from the date of sale, produce at least 80% of the minimum power output rating, where the minimum power output rating is the rated power minus the applicable tolerance, as specified in the PV Product technical data sheet.

C. Central Inverters: 10 year limited warranty.

1.6 SUBMITTALS

A. Include all PV system data necessary to show system is in compliance with all product specifications.

B. Product Data: Submit specified products as follows:

1. Manufacturer's product data, including manufacturer's SPEC-DATA product sheet.
2. Manufacturer's installation instructions.
3. Catalog pages illustrating products to be incorporated into project.

C. Shop Drawings: Indicate information on shop drawings as follows:

1. Layout and orientation of module array.
2. Roof surfaces and slopes.
3. Location of inverter, combiner box and disconnects.
4. Penetration plan.
5. Mounting details, fasteners and hardware.
6. Electrical connection details.
7. Grounding plan with wiring details.
8. String, AC and DC wiring, and termination details.
9. Remote PV performance display, data and graphic layout.

D. Wiring Diagrams: These include control system diagrams, elementary DC and AC wiring diagrams, interconnections diagrams, wireless connection diagrams, illustrative diagrams, and other like items.

E. Qualification Statements:
   1. Submit letter of verification for Manufacturer's Qualifications.
   2. Submit letter of verification for Installer's Qualifications.

1.7 OPERATION AND MAINTENANCE DATA

A. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

B. Submit operation and maintenance data for installed PV system components

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials, fixtures, and equipment required for the work shall be new, of first-class quality, and shall be furnished, delivered, erected, connected and finished in every detail, and shall be selected and arranged as to fit properly into the building spaces. Where no specific kind or quality of material is given, a first-class standard article as approved by the Construction Manager shall be furnished.

B. All equipment shall be listed and labeled per recognized electrical testing laboratory and installed per the listing requirements and the manufacturer's instructions.

C. All equipment shall be approved for use by the electric utility having jurisdiction and any applicable incentive programs.

D. All equipment shall be properly grounded per the requirements of the National Electric Code, Article 250.

E. All outdoor equipment shall be minimum NEMA 3R.

F. Provide equipment as specified on the drawings, or approved equipment of equal quality and performance. Provide all accessories needed for a complete, secure, operational grid-tied PV system.

G. Conduit specification shall comply with, NEC & Division 26 Electrical requirements.

2.2 PHOTOVOLTAIC MODULES

A. PV modules shall be IEEE 1262 compliant and listed to UL Standard 1703.

B. Basis of design for the PV modules is SolarWorld Sunmodule Plus SW 285 Mono; other PV manufacturers of equivalent quality may be submitted with the Engineers prior approval. Trina Solar, Kyocera, Canadian Solar and Sharp are acceptable manufacturers of equivalent PV modules.

C. ELECTRICAL CHARACTERISTICS (STC):

1.	Maximum power (Pmax) STC:	285 watts
2.	Open circuit voltage (Voc):	39.7 volts
3.	Maximum power voltage (Vpm):	31.3 volts
4.	Short circuit current (Isc):	9.84 amps

5.	Maximum power current (Ipm):	9.20 amps
6.	Module efficiency:	17.59 %
7.	Maximum system DC voltage:	1000 volts
8.	Series fuse rating:	15 amp
9.	NOCT	46.0 deg C

D. PHYSICAL CHARACTERISTICS:

1.	Type of Cell:	Mono-crystalline Silicon
2.	Cell Configuration:	60 in series
3.	Output Cables:	PV wire per UL4703 with H4 Connector
4.	Cable Lengths:	39.4”
5.	Dimensions (widthxlenghtxthickness):	37.44” x 65.94” x 1.22”
6.	Weight:	39.5 Ibs
7.	Max Load:	30 PSF

C. Warranty: 25-year limited warranty on power output.

2.3 CENTRAL INVERTERS

A. Basis of design for inverters is SMA SB 3800US; other Inverter manufacturers of equivalent quality may be submitted with the Engineers prior approval.

A. ELECTRICAL CHARACTERISTICS:

1.	Maximum DC Power:	3,900 watts
2.	DC Maximum Voltage:	600 volts
4.	DC Nominal Voltage Range:	195-480 volts
5.	Nominal AC Voltage:	240 volts
6.	Maximum Input Current:	10 amps
7.	Nominal AC Power:	3,800 watts @ 240 volts
8.	AC Maximum Output Current@ 240 V:	16 amps
9.	Power Factor Nominal:	0.99
10.	Peak Inverter Efficiency:	97.5%
11.	CEC Weighted Efficiency:	97.0% @ 240 V

B. PHYSICAL CHARACTERISTICS:

1.	Dimensions (width x height x thickness):	21.1” x 28.5” x 7.8”
2.	Weight:	57 Ibs
3.	Ambient Range:	-13 deg F - 113 deg F
4.	Topology:	Transformerless
5.	Mounting	Indoor or Outdoor - NEMA 3R
6.	LCD Display	Yes
7.	DC Disconnect:	Yes

C. Warranty: 10-year

2.4 ROOF SUPPORTS

A. Basis of design for the metal roof supports is Iron Ridge rails and S-5-U raised seam metal roof support attachments; other PV support manufacturers of equivalent quality may be submitted with the Engineers prior approval.

Design Criteria:

1. Roof Mounting: 20 deg metal seam roof with wood support trusses.
2. Wind Load: 100 MPH.
3. Snow Load: 30 PSF.

Support Components:

1. Rail: 6105-T5 extruded aluminum.
2. Rail Splice: 6105-T5 extruded aluminum; 8" predrilled.
3. Standing Seam Standoff: 304 stainless steel with SS fasteners.
4. Top and End Mount Clamps: 304 stainless steel or 6105-T5 extruded aluminum.
5. Fasteners: 304 stainless steel.
6. Grounding Lugs: 304 stainless steel or 6105-T5 extruded aluminum.
7. Grounding Clips and Bonding: Copper.

2.5 BALANCE OF SYSTEM COMPONENTS

A. Provide balance of system components include wiring, conduit, combiner boxes, disconnects over-current protection, surge suppression and grounding equipment as required by Code references and required for a complete and operational system.

1. MidNite Solar - MNPV Combiner Boxes.

PART 3 - EXECUTION

3.1 GENERAL

A. All electrical work shall be in accordance with the 2012 National Electric Code.

B. All circuits connected to more than one source shall have over-current devices located so as to provide over-current protection from all sources per NEC Article 690.9(a).

C. Cut no structural members. If equipment cannot be properly concealed, notify Construction Manager.

D. Contractor shall keep work areas in a clean and safe condition. Remove all equipment, tools, vehicles, rubbish, waste and debris from the site upon completion of the job. The Contractor shall pay all fees for recycling and disposal.

E. Fall arrest protection per OSHA 1926 Subpart M shall be provided for all work on top of the roof.

3.2 ELECTRICAL DESIGN AND INSTALLATION REQUIREMENTS

A. The electrical design and installation of the PV system shall conform to the 2008 National Electrical Code (NEC, NFPA 70). Article 690 of the NEC applies specifically to photovoltaic system safety, protection, control, and interface with other sources. Other articles of the NEC also apply.

B. The PV system electrical design shall also comply with the IEEE std.1374 (Guide for Terrestrial Photovoltaic Power System Safety).

C. The following are specific electrical requirements for this system and installation:

1. All equipment and electrical hardware used in the system, including overcurrent protection, disconnects, surge suppression devices, conduit, wiring and terminals, must be approved, recognized, or listed for the intended application by a NRTL, and have appropriate voltage, current, and temperature ratings for the application.
2. Inverters, controllers, and PV modules must have specific listings as noted elsewhere in this document.
3. All circuit breakers, fuses, and disconnects must be listed or recognized for use in DC circuits where applicable. Equipment only rated for use in AC circuits will not be permitted for use in DC circuits.
4. All DC conductors shall be sized such that there is a maximum of 1.5% voltage drop measured at the short circuit current rating of that circuit over the entire length of each circuit from PV module to inverter and back to PV module. All AC conductors shall be sized for maximum of 1.5% voltage rise measured at the continuous AC current rating of the inverter between the inverter and the point of interconnection with the grid.
5. Each series string of PV modules shall be independently protected by an isolation fuse or breaker before it is connected in parallel with the other string on that PV output circuit.
6. The current rating of this isolation fuse or breaker shall be less than the de-rated ampacity of the wiring that it is protecting and greater than 1.56 times the short circuit current rating of the PV modules in that PV source circuit.
7. All other conductors and overcurrent devices shall be sized per the requirements of National Electric Code (NEC) Article 690.8.
8. All wiring shall be listed for a minimum operation of 600 Volts and temperature rating of 90 degree Celsius in wet locations. With an exception of the PV module interconnect wiring, the use of any exposed conductors or cabling (excluding grounds) is not acceptable. All conductors must be installed in conduit.
9. PV module interconnect wiring must be sunlight-resistant USE2, or equivalent rated conductor, and must be attached to module junction boxes using weather-tight strain relief. The module wiring interconnections shall use a connector device that allows quick assembly and disassembly of the arrays under no load conditions. These connectors must be listed by a NRTL, and be weather-sealed, guarded and polarity protected.
10. With the exception of the module interconnect wiring, all terminations must use listed box terminal or compression type connections, and must be made with an appropriate junction box or enclosure. Exposed, field splices between conductors will not be permitted. Twist on wire splices, crimped, soldered, or taped connections are not permitted for the required field installed wiring of DC circuits. Proper torque specifications should be provided for all of the required field connections, and all the termination points should be liberally coated with an anti-corrosion spray to preserve the quality of all connections over time.
11. All system conductors must have appropriate means for disconnecting and overcurrent protection, and require the use of switches, fuses or circuit breakers as applicable. All overcurrent devices shall have trip ratings no greater than the de-rated ampacity of the conductors that it protects.
12. All series connected strings of modules (source circuits) must include a series fuse as required by UL and NEC Standards to prevent excessive reverse current flow through modules in source circuits under fault conditions, and diodes must be contained in a listed junction/combiner box.
13. All metallic modules frames, panel/array support structures, metal enclosures, panel boards and the inverter cabinets must be properly bonded to a common equipment grounding conductor and terminate at the grounding electrode at the utility service point. All grounding connections and terminations should be made accessible for routine inspections and maintenance as required.

14. Surge suppression on the DC and AC side of the inverter must be provided. Silicon oxide varistors (SOVs) commonly used to protect electrical panels and equipment may be used for this purpose, and may be provided and/or required by the inverter manufacturer.
15. All equipment installed outside shall have enclosures rated as NEMA 3R or better and have superior strength and corrosion resistance properties.
16. An outdoor rated disconnect device must be installed in all systems at the interface between the PV system inverter and the connection to the utility grid. This disconnect device shall be a visible break, lockable device, and shall be installed at convenient location on the outside of premises near the service point/point of common coupling.
17. A standard utility watt-hour meter socket enclosure shall be provide on the PV system side of this disconnect.
18. All electrical equipment, enclosures, disconnects, and overcurrent devices must be clearly marked and identified. A one-line diagram of the system must be kept on site for reference.

3.3 MECHANICAL DESIGN AND INSTALLATION REQUIREMENTS

A. All hardware required for installing PV arrays and other system equipment must be provided for the installations.

B. The following are requirements for mounting the PV arrays, equipment, and other materials and mechanical design considerations associated with this project:

1. The array mounting systems and overall installation must meet all applicable local building codes and be capable of withstanding winds of Category 2 or greater (100 mph - 3 second gust) for all attachment points, which are consistent with the module manufacturer's installation instructions.
2. The system installation and equipment layout should be considered with respect to the need for access, maintenance and future expansion of the system.
3. Array mounting hardware supplied for this installation should be compatible with site considerations and environment. Special attention should be paid to minimizing the risk from exposed fasteners, sharp edges, and potential damage to the modules or support structure.
4. Corrosion resistance and durability of the mechanical hardware is emphasized. All materials should be selected to avoid corrosion and degradation. The use of ferrous metals, contact of dissimilar metals, and the use of wood or plastic components are prohibited. Aluminum and stainless steel components and hardware are preferred.
5. To create a uniform appearance of the array, spacing between individual modules and panels should be kept to the minimum and overall layout in keeping with the overall architectural features of the buildings and properties. As much as possible, all mechanical hardware, Conduit, junction boxes, and other equipment should be concealed beneath and/or behind the array, and all other electrical work performed neatly and as inconspicuously as possible.
6. The array layout should be consistent with the electrical ordering (and labeling) of source circuits in the array combiner boxes. Ease of access for array troubleshooting and maintenance is desired by allowing access to the back of the array for module junction box servicing, and removal/replacement of individual source circuits (panels) and modules if necessary.

3.4 POWER MAXIMIZATION

A. Locations of PV panels are indicated on the architectural drawings. Architect shall approve where PV Panels are located.

B. During the Shop Drawing phase and prior to installation of the PV array, a review of array placement for minimizing shading and providing maximum power production shall be established by the Electrical Contractor and forwarded to the Engineer for approval.

3.5 COMMISSIONING

A. Electrical Contractor shall provide final and complete commissioning of the PV system.

B. Electrical Contractor shall verify that all Electrical components are installed and connected according to the requirements of the PV electrical drawings, specifications, and manufacturer's written instructions.

C. Before starting or operating the system Electrical Contractor shall check continuity of all conductors and grounding conductors to verify that there are no faults and that all equipment has been properly installed. Check factory instructions to see that installations have been made accordingly.

D. Before starting or operating the PV system, the Electrical Contractor shall obtain a final inspection approval and final inspection from local utility. Electrical Contractor shall be present on site for both of these inspections.

E. Electrical Contractor shall test all equipment to ensure specified capacity and performance of the system. The Electrical Contractor shall notify the Construction Manager a minimum of 5 days prior to the test so that an Owner's representative may witness the test.

F. PV Module Test: During the daytime while the sun is shining on the PV array, measure the circuit current and circuit voltage of each string (in isolation from other parallel strings) and verify that the output is consistent with PV module manufacturer's specifications.

G. Contractor shall make final adjustments to all inverters and monitoring equipment so that they will be placed in an acceptable operating condition. Adjustable parameters shall be set so that the PV system will produce the minimum possible amount of energy on an annual basis.

H. Replace all damaged and/or malfunctioning equipment.

3.4 INSPECTIONS, ACCEPTANCE TESTING, AND AGENCY TRAINING

A. All system installations must be properly plan checked, permitted, and inspected by the AHJ. Evidence of these permit(s) and inspections shall be provided at the time of acceptance testing and before final payment will be authorized.

B. Acceptance testing will verify that the system and equipment specified in the bid was installed in a safe, workman-like, and code-compliant manner, and is operating properly under all conditions.

C. Final contract payment will be tied to successfully completing acceptance testing, and delivery of the complete System Manual.

D. The Contractor will also be required to provide a minimum of one 2-hour training session. Topics to be covered in this training include theory of operation, operating requirements, component descriptions and specifications, maintenance requirements and schedule, safety precautions, and overview of the System O&M Manual.

END OF SECTION

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RFB #316021

SILVERWOOD STONE HOUSE - PHASE 2

771 SILVER LANE
EDGERTON, WI 53534

COMPLETION OF WORK ON
ADDITION AND REMODEL

PROJECT IMAGE

PROJECT/BUILDING DATA:

BUILDING AREAS
TOTAL BUILDING AREA = 2,528 SQFT
EXISTING BUILDING AREA = 2,728
EXISTING BUILDING AREA REMOVED:
SECOND FLOOR = 901
PREVIOUS ADDITION = 701
ADDITION BUILDING AREA = 701

FIRST FLOOR TOTAL AREA= 1,590 SQFT
FIRST FLOOR EXISTING = 889 (STONE HOUSE)
FIRST FLOOR ADDITION = 701
SECOND FLOOR TOTAL AREA = 0 SQFT
SECOND FLOOR EXISTING= 901 (STONE HOUSE)
SECOND FLOOR REMOVAL= 901 (STONE HOUSE)

PARKING COUNTS
TOTAL ACCESSIBLE SPACES = 1

CODE INFORMATION SUMMARY:

APPLICABLE CODE
2009 WISCONSIN COMMERCIAL BUILDING CODE

CONSTRUCTION TYPE
TYPE VB = 2 STORY BUILDING (EXISTING)
TYPE VB = 1 STORY BUILDING (NEW)

OCCUPANCY
A3 - ASSEMBLY

FIRE SPRINKLER
BUILDING IS NOT SPRINKLERED

FIRE RESISTANCE RATING BUILDING ELEMENTS
STRUCTURAL FRAME (COLUMNS & BEAMS) = 0 HOUR
BEARING WALLS (EXTERIOR AND INTERIOR) = 0 HOUR
NON-BEARING WALLS (EXTERIOR) =
1 HOUR < 10' TO PROPERTY LINE
NO RATING > 10' TO PROPERTY LINE
FLOOR = 0 HOUR
ROOF = 0 HOUR

REQUIRED FIRE BARRIER/PARTITION FIRE
RESISTANT RATINGS:
SHAFTS: 1 HOURS

SEE CODE COMPLIANCE PLANS FOR MORE INFORMATION

DESCRIPTION OF WORK:

THE WORK CONSISTS OF RENOVATIONS TO SILVERWOOD COUNTY PARK STONE HOUSE. PHASE 1 OF THIS WORK HAS BEEN COMPLETED, WHICH CONSISTED OF EXTERIOR AND INTERIOR WALL FRAMING; EXTERIOR CLADDING; ROOF SHEATHING, INSULATION, AND STANDING SEAM METAL PANELS; ROOF FRAMING; WINDOWS; TEMPORARY EXTERIOR DOORS; NEW CONCRETE SLABS; AND STUBBED OUT PLUMBING.

PHASE 2 OF THE WORK, COVERED IN THIS CONSTRUCTION DOCUMENTS PACKAGE, WILL INCLUDE, BUT IS NOT LIMITED TO, ADDITIONAL INSULATION; CONCRETE SEALING; INSTALLING STONE FLOOR BASE; ADDITIONAL WOOD STUD FRAMING IN SELECT LOCATIONS; PATCHING, CLEANING, PREPARING AND FINISHING WOOD FLOORS; INSTALLING EXTERIOR AND INTERIOR DOORS; ROOF GUTTERS, DOWNSPOUTS, SPLASH BLOCKS, AND SNOW GUARDS; INSTALLING COUNTERTOPS AND CABINETS; TOILET COMPARTMENTS AND BATHROOM ACCESSORIES; AND INTERIOR FINISHES, INCLUDING SOME PAINTING. MEP WORK TO INCLUDE MISCELLANEOUS PLUMBING FIXTURES, PHOTOVOLTAIC ROOF PANELS, EXTERIOR AND INTERIOR LIGHTING, MISCELLANEOUS ELECTRICAL WORK, AND MISCELLANEOUS HVAC WORK.

LIST OF DRAWINGS

Architecture : **Dimension IV - Madison Design Group**
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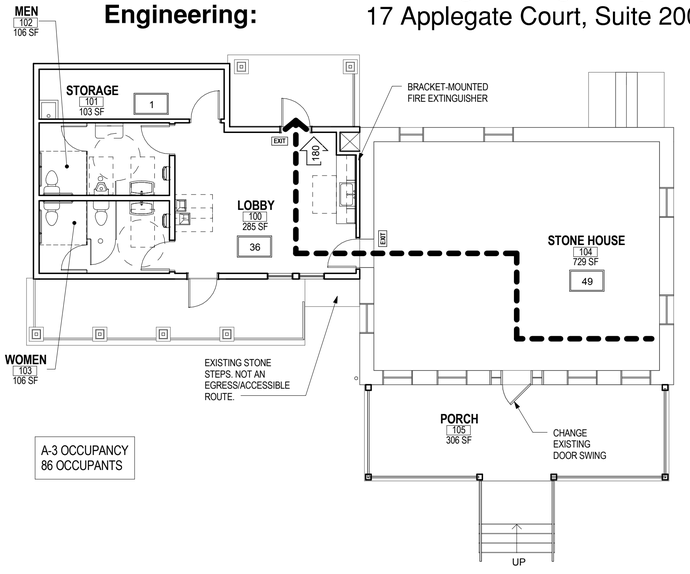
p: 608.829.4444 www.dimensionivmadison.com

MEP Engineering: **Hein Engineering Group**
17 Applegate Court, Suite 200, Madison, WI 53713



A-3 OCCUPANCY
86 OCCUPANTS

1 **CODE COMPLIANCE - FIRST FLOOR**
1/8" = 1'-0"

CODE COMPLIANCE GENERAL NOTES

A. GRAB BARS:
INSTALLED GRAB BARS AT TOILETS WITH BLOCK (INCLUDING VERTICAL GRAB BAR) (PER 2003 ICC/ANSI A117.1)

B. REFER TO SHEET A7.0 FOR ACCESSIBLE MOUNTING AND CLEARANCES INFORMATION.

C. ALL FIRE EXTINGUISHER CABINETS SHALL BE IN APPROVED LOCATIONS WITH A MAXIMUM TRAVEL DISTANCE TO EXTINGUISHER TO BE 75 FEET PER I.F.C.

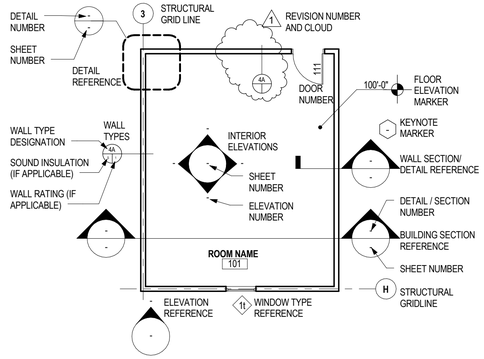
D. EXIT ACCESS TRAVEL DISTANCE IS 200 FEET WITHOUT SPRINKLERS PER TABLE 1016.1.

E. COMMON PATH OF EGRESS TRAVEL SHALL NOT EXCEED 75' PER 1014.3.

CODE COMPLIANCE SYMBOLS LEGEND

- INDICATES HANDICAP FULLY ACCESSIBLE UNIT
- XXX — INDICATES OCCUPANCY CAPACITY
- INDICATES ADA ACCESSIBLE ROUTE
- XXX — INDICATES EXIT AND EXIT CAPACITY
- INDICATES SMOKE BARRIER WALL (SEC 709)
- INDICATES 1 HOUR FIRE RATED WALL (SEC 709)
- INDICATES 2 HOUR FIRE RATED WALL (SEC 709)

AREA MAP



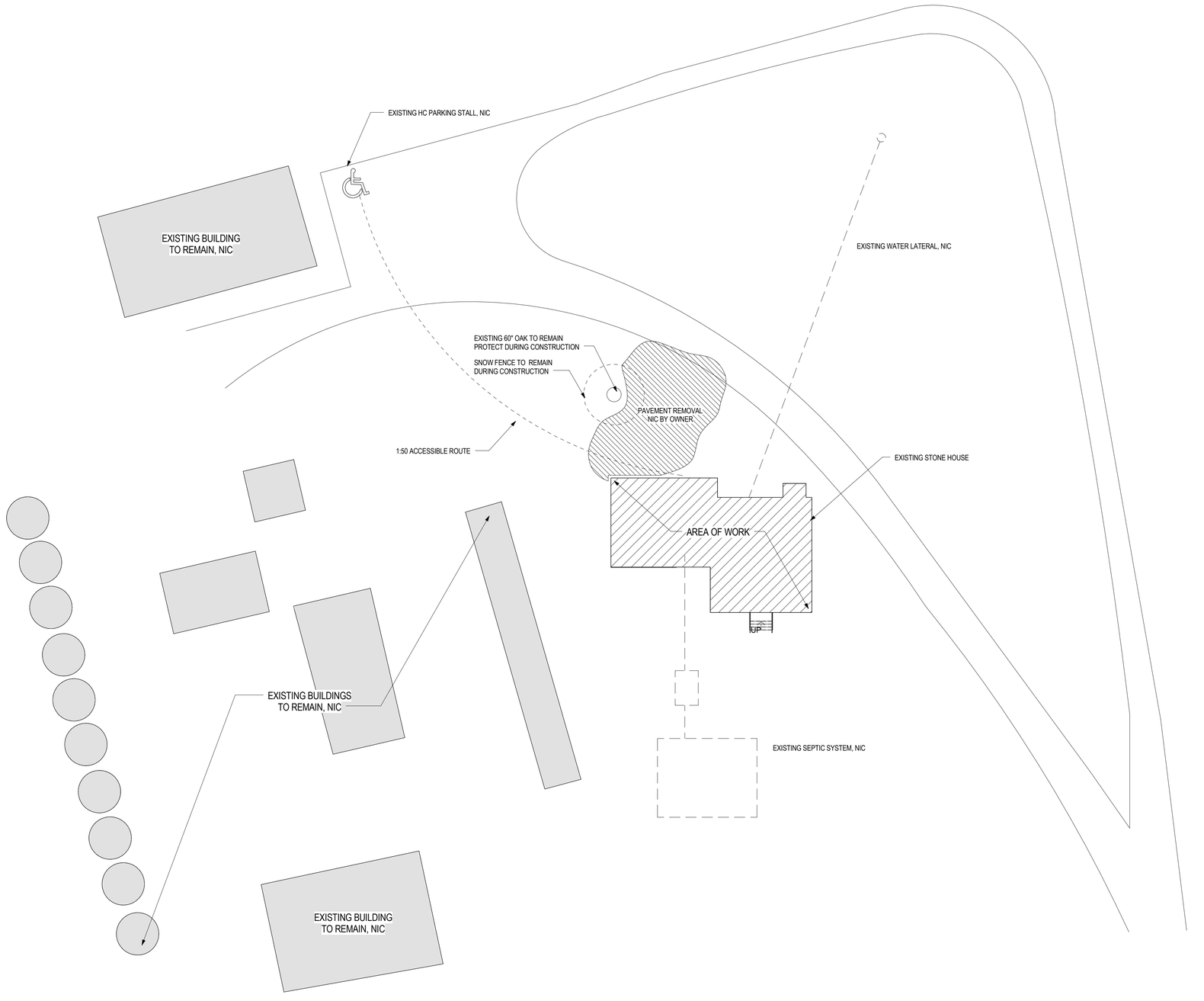
ARCHITECTURAL SYMBOLS LEGEND

BID SET

PROJECT # 14099

PHASE 1 06/05/2015
PHASE 2 11/08/2017

G0.1



1 **SITE PLAN**
1" = 20'-0"

0' 5' 10' 20'

NORTH

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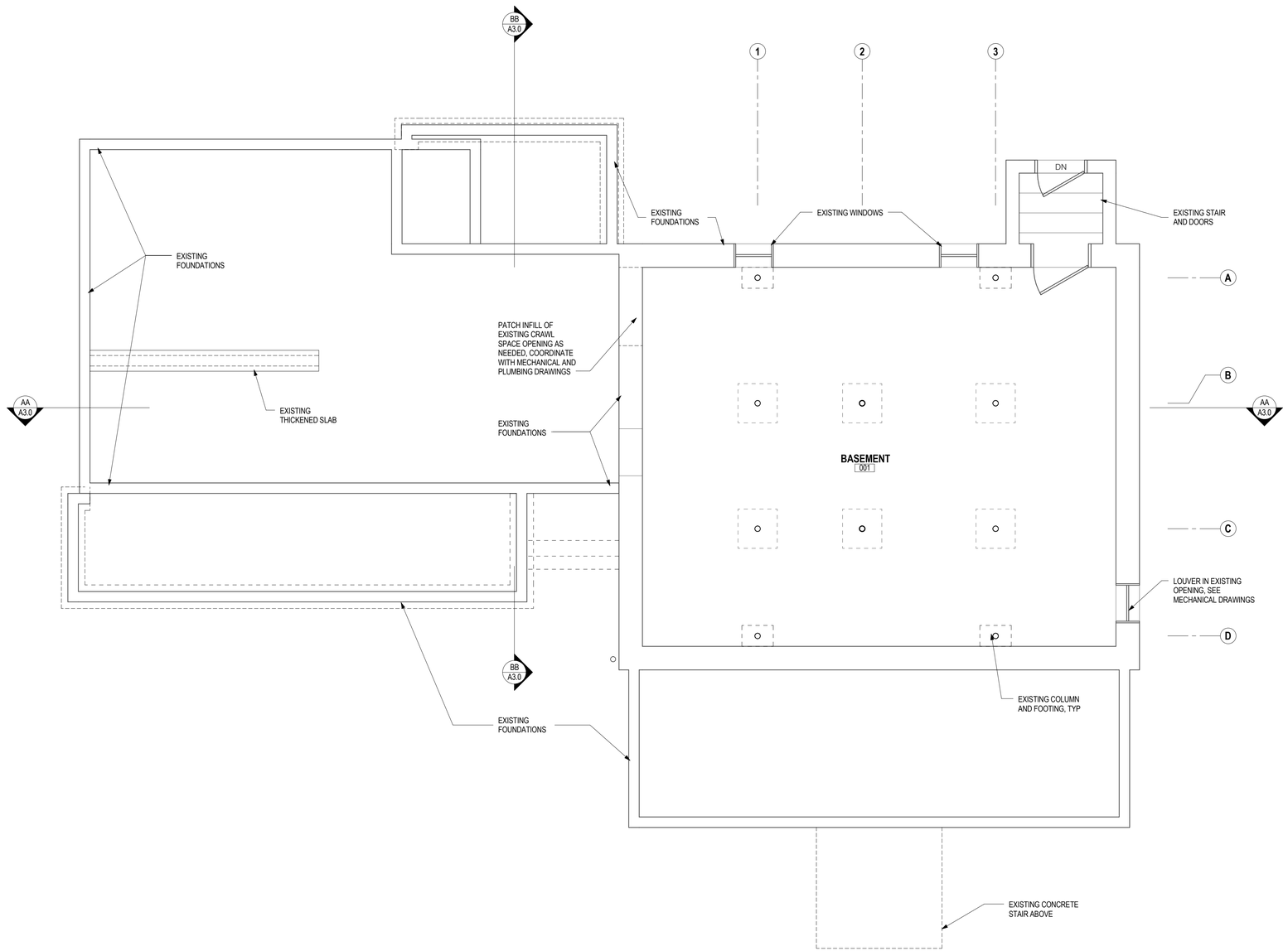
ARCHITECTURAL SITE PLAN

AS1.0



1 **BASEMENT PLAN**
1/4" = 1'-0"

0' 1' 2' 4'

NORTH

FLOOR PLAN GENERAL NOTES

A. SALVAGED MATERIALS TO BE USED WHENEVER POSSIBLE, REFER TO OWNER

B. SEE SHEET A7.0 FOR INTERIOR ELEVATIONS.

C. PROVIDE VERTICAL CONTROL JOINTS (CJ'S) WHERE STRUCTURAL SYSTEMS CHANGE, LOCATIONS THAT ARE PRONE TO CRACKING AND AS REQUIRED BY MANUFACTURES INSTALLATION RECOMMENDATIONS.

D. VERIFY SIZE AND LOCATIONS OF ALL MECHANICAL OPENINGS. GENERAL CONTRACTOR TO PAINT AND SEAL LOUVER PERIMETER, TYPICAL. VERIFY ALL ACTUAL CHASE DIMENSIONS WITH HVAC CONTRACTOR.

E. GENERAL CONTRACTOR TO PROVIDE CONCRETE EQUIPMENT PADS/CURBS AS REQUIRED FOR MECHANICAL/ELECTRICAL EQUIPMENT. VERIFY SIZE/PROFILE/LOCATION WITH PLUMBING/MECHANICAL/ELECTRICAL.

F. GENERAL CONTRACTOR TO PROVIDE WOOD BLOCKING BETWEEN WOOD STUDS AS REQUIRED FOR CASEWORK/HANDRAIL/TOILET ACCESSORIES ETC. MOUNTING.

G. ADA CLEARANCE CIRCLES AND BOXES SHOWN ON PLAN ARE FOR INFORMATION PURPOSES ONLY.

H. DIMENSIONS ARE FROM FACE OF STUD AT NEW WORK AND WHERE EXISTING STUDS EXPOSED. AT EXISTING FINISHED WORK, DIMENSIONS ARE FROM FINISHED FACE, UNLESS NOTED OTHERWISE.

J. EXISTING WINDOWS AND DOORS TO BE INSPECTED FOR LEAKS AND DAMAGE. RESEAL, REPAIR, AND REPAINT AS REQUIRED.

K. REMOVE STICKERS AND FILMS FROM WINDOWS AND DOORS

L. COMPLETE REMAINDER OF WORK AT PARTIALLY COMPLETED WALLS, SEE WALL TYPE DETAILS 3 / A1.1

M. INSTALL PRECAST CONCRETE SPLASH BLOCKS AT DOWNSPOUT OUTLETS.

N. PATCH EXISTING WOOD FLOOR AS NEEDED. PREPARE FLOOR FOR FINAL FINISH, SEE FINISH INFORMATION ON SHEET A9.0.

P. SEE DRAWINGS DATED 06/05/2017 FOR WORK PREVIOUSLY PERFORMED.

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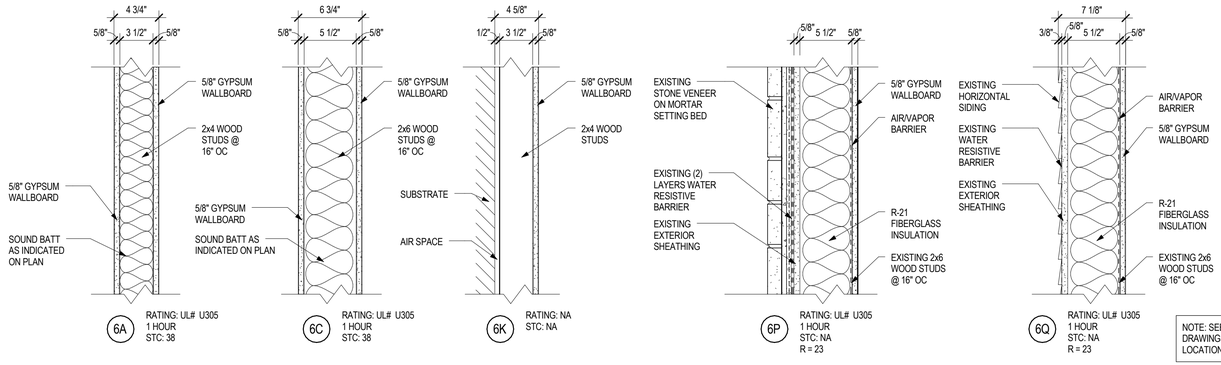
BASEMENT FLOOR PLAN

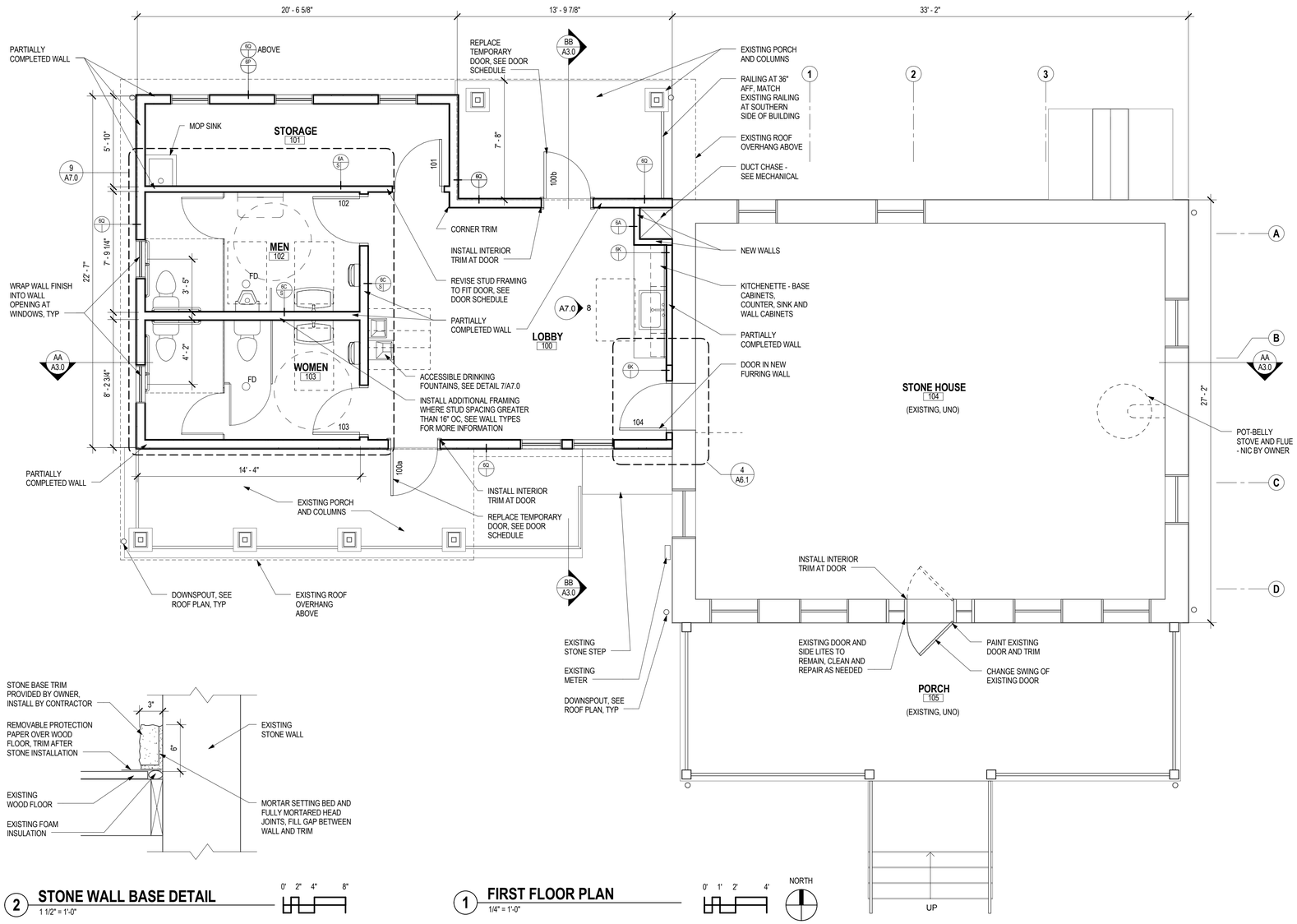
A1.0



NOTE: SEE STRUCTURAL DRAWINGS FOR BEARING WALL LOCATIONS AND INFORMATION

3 WALL TYPE DETAILS

1 1/2" = 1'-0"



2 STONE WALL BASE DETAIL

1 1/2" = 1'-0"

0' 2" 4" 8"

1 FIRST FLOOR PLAN

1/4" = 1'-0"

0' 1' 2' 4'

NORTH

FRAME WALL TYPE GENERAL NOTES

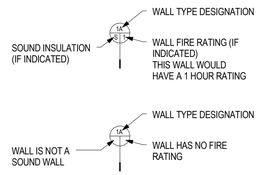
A. INSTALLATION OF GYPSUM BOARD, BACKER BOARD AND BASE BOARD SHALL CONFORM TO REQUIREMENTS FOR FIRE RATINGS AND ACOUSTICAL RATINGS.

B. STUD FRAMING TO BE 1'-4" O.C. UNLESS NOTED OTHERWISE.

C. PROVIDE MOISTURE RESISTANT GYPSUM BOARD AT WALLS AND CEILINGS OF TOILET & BATH ROOMS.

D. SEE STRUCTURAL DRAWINGS, DATED 06/05/2015, FOR MORE INFORMATION.

WALL DETAIL NOTES



1. TO ACHIEVE STC RATING, ADD FIBERGLASS BATT INSULATION TO THE ENTIRE WIDTH OF STUD CAVITY, TYP.

WALL TYPE GENERAL NOTES

A. CONTINUE ALL PARTITION FRAMING AND GYPSUM BOARD TO UNDERSIDE OF CEILING, UNLESS INDICATED OTHERWISE.

B. WHERE WALLS AND/OR FURRING MEET, MAINTAIN A FLUSH SURFACE ON THE SIDE WHERE WALL SURFACE IS STRAIGHT OR CONTINUOUS, UNLESS INDICATED OTHERWISE.

C. PROVIDE WOOD BLOCKING IN PARTITION TYPES AS REQUIRED BY ACCESSORIES INDICATED ON DRAWINGS.

FLOOR PLAN GENERAL NOTES

A. SALVAGED MATERIALS TO BE USED WHENEVER POSSIBLE, REFER TO OWNER

B. SEE SHEET A7.0 FOR INTERIOR ELEVATIONS.

C. PROVIDE VERTICAL CONTROL JOINTS (CJS) WHERE STRUCTURAL SYSTEMS CHANGE, LOCATIONS THAT ARE PRONE TO CRACKING AND AS REQUIRED BY MANUFACTURES INSTALLATION RECOMMENDATIONS.

D. VERIFY SIZE AND LOCATIONS OF ALL MECHANICAL OPENINGS. GENERAL CONTRACTOR TO PAINT AND SEAL LOUVER PERIMETER, TYPICAL. VERIFY ALL ACTUAL CHASE DIMENSIONS WITH HVAC CONTRACTOR.

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K. REMOVE STICKERS AND FILMS FROM WINDOWS AND DOORS

L. COMPLETE REMAINDER OF WORK AT PARTIALLY COMPLETED WALLS, SEE WALL TYPE DETAILS 3 / A1.1

M. INSTALL PRECAST CONCRETE SPLASH BLOCKS AT DOWNSPOUT OUTLETS.

N. PATCH EXISTING WOOD FLOOR AS NEEDED. PREPARE FLOOR FOR FINAL FINISH, SEE FINISH INFORMATION ON SHEET A9.0.

P. SEE DRAWINGS DATED 06/05/2017 FOR WORK PREVIOUSLY PERFORMED.

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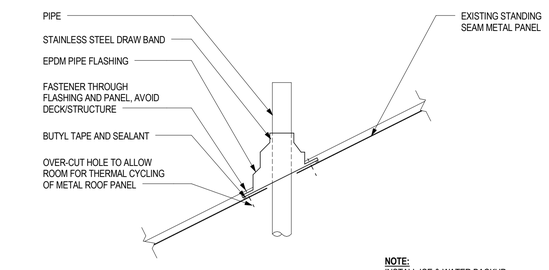
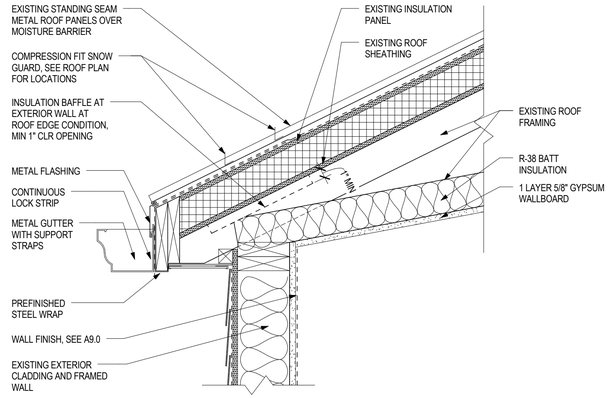
FIRST FLOOR PLAN

A1.1



3 PIPE FLASHING DETAIL

NTS



2 ROOF/EAVE DETAIL

1 1/2" = 1'-0"

0" 2" 4" 8"

FLOOR PLAN GENERAL NOTES

A. SALVAGED MATERIALS TO BE USED WHENEVER POSSIBLE, REFER TO OWNER

B. SEE SHEET A7.0 FOR INTERIOR ELEVATIONS.

C. PROVIDE VERTICAL CONTROL JOINTS (CJ'S) WHERE STRUCTURAL SYSTEMS CHANGE, LOCATIONS THAT ARE PRONE TO CRACKING AND AS REQUIRED BY MANUFACTURES INSTALLATION RECOMMENDATIONS.

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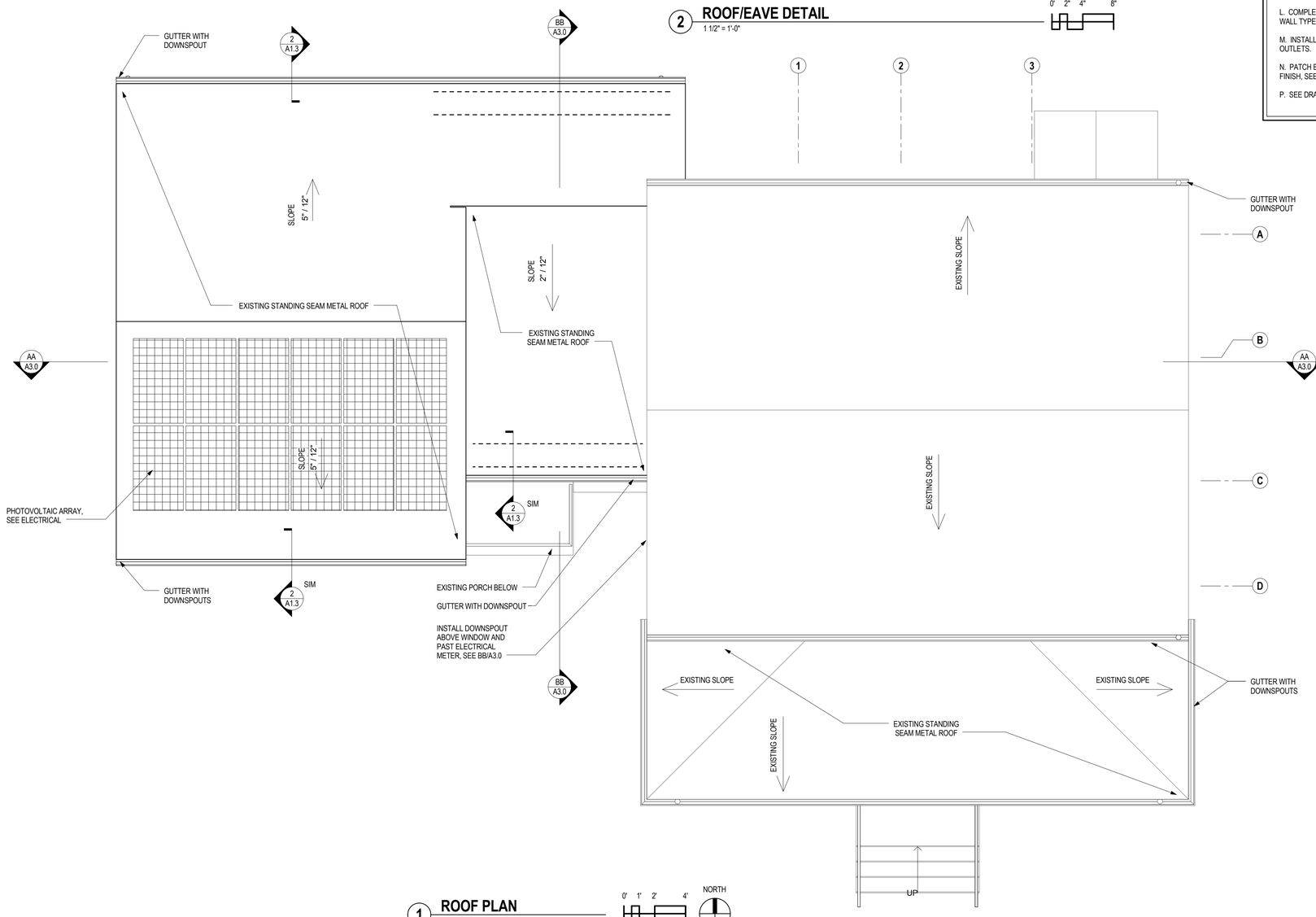
K. REMOVE STICKERS AND FILMS FROM WINDOWS AND DOORS

L. COMPLETE REMAINDER OF WORK AT PARTIALLY COMPLETED WALLS, SEE WALL TYPE DETAILS 3 / A1.1

M. INSTALL PRECAST CONCRETE SPLASH BLOCKS AT DOWNSPOUT OUTLETS.

N. PATCH EXISTING WOOD FLOOR AS NEEDED. PREPARE FLOOR FOR FINAL FINISH, SEE FINISH INFORMATION ON SHEET A9.0.

P. SEE DRAWINGS DATED 06/05/2017 FOR WORK PREVIOUSLY PERFORMED.



1 ROOF PLAN

1/4" = 1'-0"

0' 1' 2' 4' NORTH

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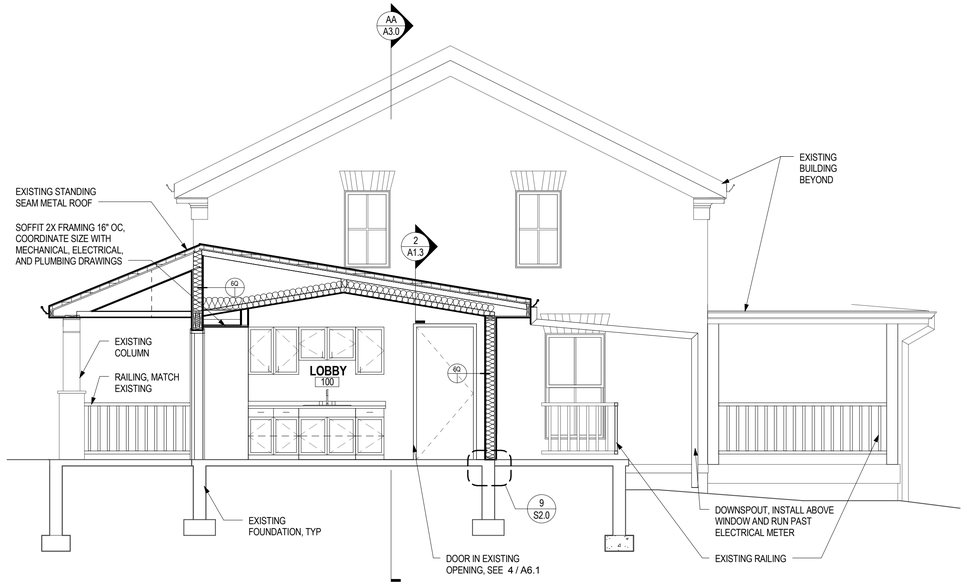
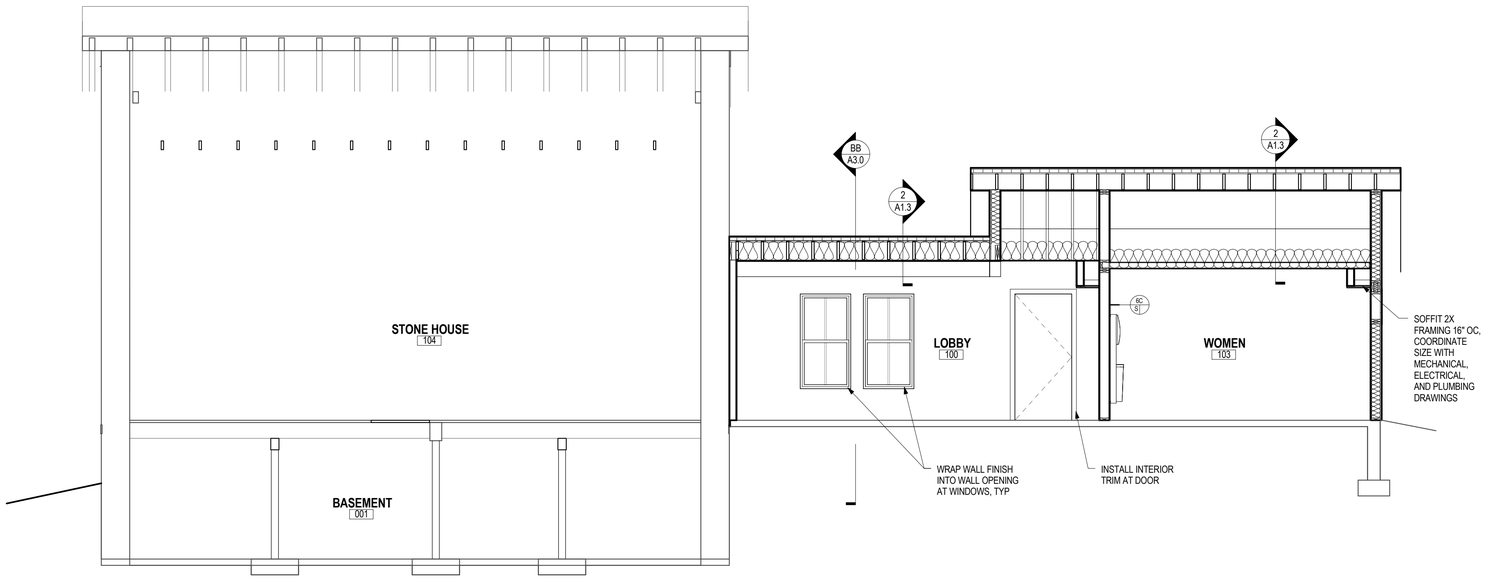
ROOF PLAN

A1.3



BB **BUILDING SECTION**
1/4" = 1'-0"

0' 1' 2' 4'



AA **BUILDING SECTION**
1/4" = 1'-0"

0' 1' 2' 4'

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PROJECT # 14099

BUILDING SECTIONS

A3.0

REFLECTED CEILING PLAN GENERAL NOTES

A. REFER TO ELECTRICAL DRAWINGS FOR FIXTURE INFORMATION.

B. REFER TO HVAC DRAWINGS FOR FIXTURE/EQUIPMENT LOCATIONS.

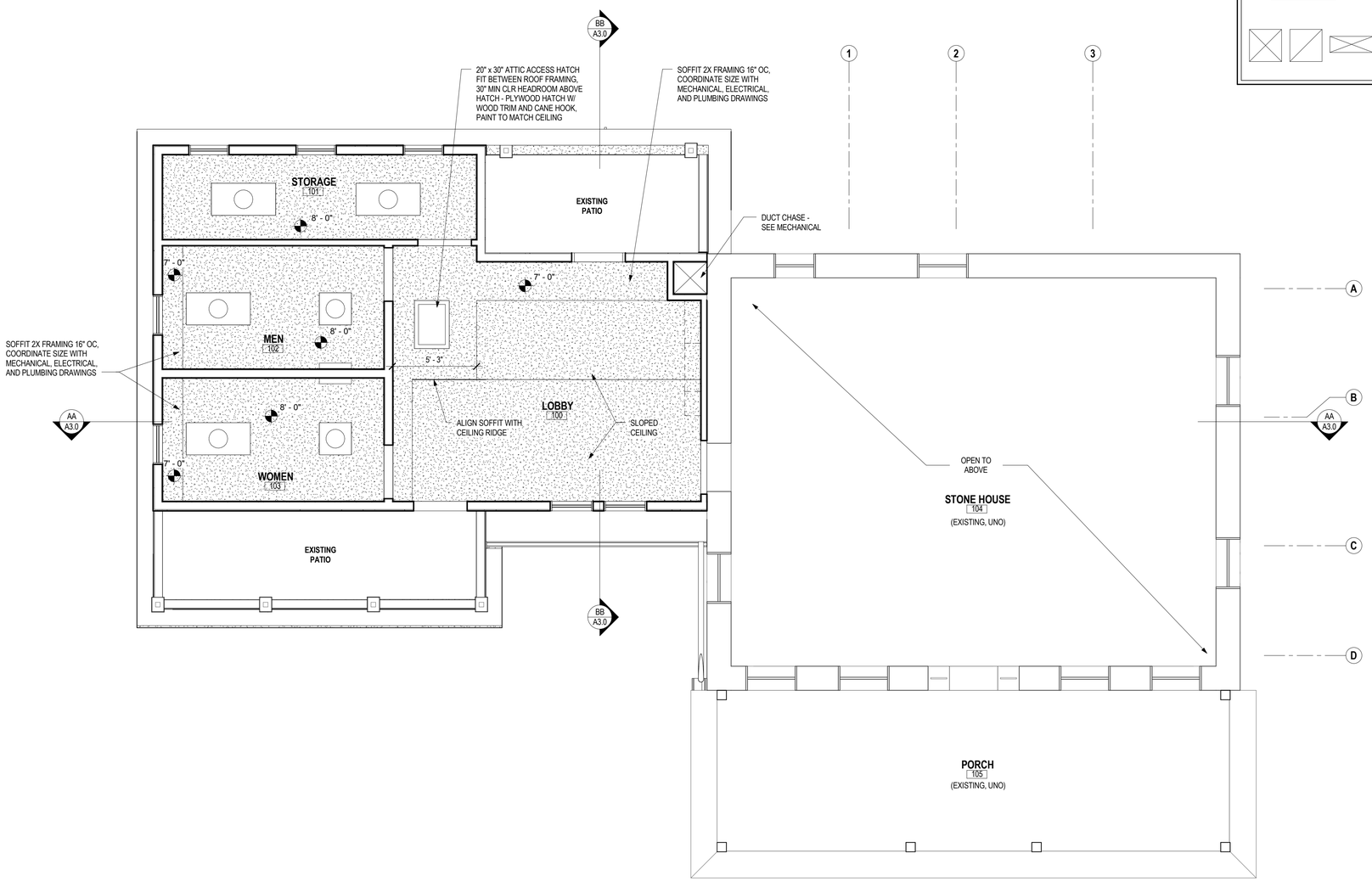
C. CENTER LIGHT FIXTURES, FIRE SPRINKLER HEADS, DIFFUSERS AND OTHER FIXTURES WHERE POSSIBLE, UNLESS NOTED OTHERWISE.

D. COMPLETE REMAINDER OF WORK AT CEILINGS, SEE 2 / A1.3 FOR MORE INFORMATION.

E. COORDINATE WITH ARCHITECT IF CEILINGS LESS THAN 7'-0".

REFLECTED CEILING LEGEND

- GYPSUM BOARD CEILING/SOFFIT
- EXPOSED TO STRUCTURE
- 2x4 LIGHT FIXTURE
- 2x2 LIGHT FIXTURE
- RECESSED CAN LIGHT
- LINEAR LIGHT FIXTURE
- RETURN OR EXHAUST DUCT/CEILING DIFFUSER



1 **FIRST FLOOR RCP**
1/4" = 1'-0"

0' 1' 2' 4'

NORTH

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SILVERWOOD STONE HOUSE - PHASE 2

771 SILVER LANE
EDGERTON, WI 53534

DATE OF ISSUE: 11/08/2017

REVISIONS:

PROJECT # 14099

REFLECTED CEILING PLANS

A4.0

DOOR SCHEDULE

DOOR NO.	ROOM NAME	TYPE	DOOR W	DOOR H	DOOR T	DOOR ELEV	DOOR MATERIAL	DOOR UNDER CUT	FRAME ELEV	FRAME MATERIAL	FRAME HEAD	FRAME JAMB	FRAME SILL	GLAZE	FIRE RATING	HARDWARE	COMMENTS
FIRST FLOOR																	
100a	LOBBY	Single	EXISTING	EXISTING	EXISTING	EXISTING			EXISTING	WD	5/A6.1	5/A6.1				EXISTING	4, 2
100b	LOBBY	Single	EXISTING	EXISTING	EXISTING	EXISTING			EXISTING	WD	5/A6.1	5/A6.1				EXISTING	4, 2
101	STORAGE	Single	3' - 0"	6' - 8"	1 3/4"	F	WD		A	WD	5/A6.1	5/A6.1				1	5
102	MEN	Single	3' - 0"	6' - 8"	1 3/4"	F	WD		A	WD	5/A6.1	5/A6.1				2	5
103	WOMEN	Single	3' - 0"	6' - 8"	1 3/4"	F	WD		A	WD	5/A6.1	5/A6.1				2	5
104	LOBBY	Single	3' - 0"	7' - 0"	1 3/4"	FL	WD		A	WD	4/A6.1	4/A6.1				3	3, 5, 6, 7

HARDWARE SCHEDULE

SET #	LOCK SETS: PRIVACY LOCK	PASSAGE LOCK	STOREROOM LOCK	CLOSER
1			X	
2	X			X
3		X		

DOOR SCHEDULE COMMENTS

1. KICK PLATE (CORRIDOR SIDE ONLY). VERIFY SIZE AND MATERIAL WITH OWNER
2. REMOVE TEMPORARY DOORS, HARDWARE TO BE SALVAGED FROM TEMPORARY DOOR FOR USE ON SCHEDULED DOOR
3. NO LOCK OR CLOSER
4. WEATHER STRIPPING
5. WALL STOP
6. VERIFY EXISTING OPENING SIZE
7. 20"x20" LOUVER

DOOR SCHEDULE GENERAL NOTES

A. WOOD DOORS TO BE PRE-FINISHED.

B. ALL SWING DOORS TO RECEIVE 1-1/2 PAIR HINGES, U.N.O.

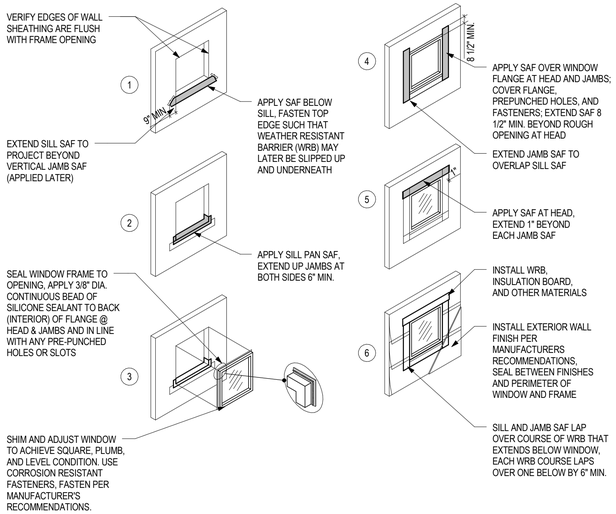
C. PROVIDE ADA APPROVED LEVER HANDLE LOCK/LATCH SETS AT ALL DOORS INCLUDING EXISTING, U.N.O.

D. ALL EXTERIOR DOORS TO RECEIVE WEATHER STRIP AND LOW PROFILE THRESHOLD.

E. VERIFY EXTERIOR DOOR TYPE WITH OWNER.

DOOR SCHEDULE LEGEND

WD = WOOD
HM = HOLLOW METAL
INSHM = INSULATED HM
FG = FULL GLASS
SC = SOLID CORE
HC = HOLLOW CORE



NOTES:

1. SECTION 1405.3 OF THE I.B.C. STATES "FLASHING SHALL BE INSTALLED IN SUCH A MANNER SO AS TO PREVENT MOISTURE FROM ENTERING." THE PROCEDURE ABOVE IS RECOMMENDED TO ACHIEVE THIS INTENT FOR FLASHING OF WALL OPENINGS TO INCLUDE BUT NOT LIMITED TO: WINDOWS, DOORS, VENTS, ETC.

2. ALL MATERIALS SHALL BE IN STRICT CONFORMANCE WITH I.B.C. STANDARD 14-1.

3. APPLICATION OF FINISH MATERIALS OVER FLASHING MATERIALS SHOWN SHALL BE AS SPECIFIED BY CODE REQUIREMENTS, MANUFACTURER'S INSTRUCTIONS AND THE BEST PRACTICES OF THE TRADE.

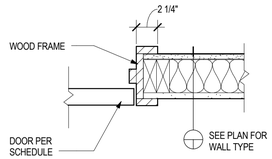
4. ADDITIONAL MATERIALS, I.E. METAL HEAL FLASHING, ELASTOMERIC SHEET WATERPROOFING ETC. MAY OCCUR, DEPENDING ON THE SPECIFIC FINISH MATERIALS BEING USED. REFER TO INDIVIDUAL DETAILS FOR ADDITIONAL INFORMATION.

5. DOOR FLASHING SIMILAR.

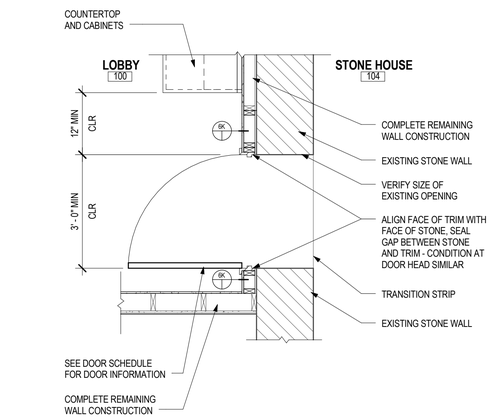
6. USE 9" MINIMUM WIDE SELF-ADHERED FLASHING (SAF) TYP. U.N.O., SEE WINDOW DETAILS FOR ADDITIONAL INFORMATION.

7. IF USING PLASTIC SHEET WEATHER RESISTANT BARRIER (WRB), CUT HORIZONTAL SLIT TO ALLOW SILL SAF TO EXTEND THROUGH AND OVERLAP. REPAIR ALL EXPOSED CUT EDGES W/TAPE APPROVED BY WRB MANUFACTURER.

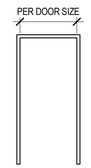
3 WINDOW FLASHING DETAILS
NTS



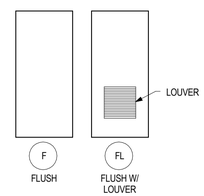
5 WOOD DOOR JAMB @ INTERIOR PARTITION (HEAD SIM)
1 1/2" = 1'-0"



4 DOOR FRAMING DETAIL
1/2" = 1'-0"



2 DOOR FRAME ELEVATIONS
1/4" = 1'-0"



1 DOOR TYPE ELEVATIONS
1/4" = 1'-0"

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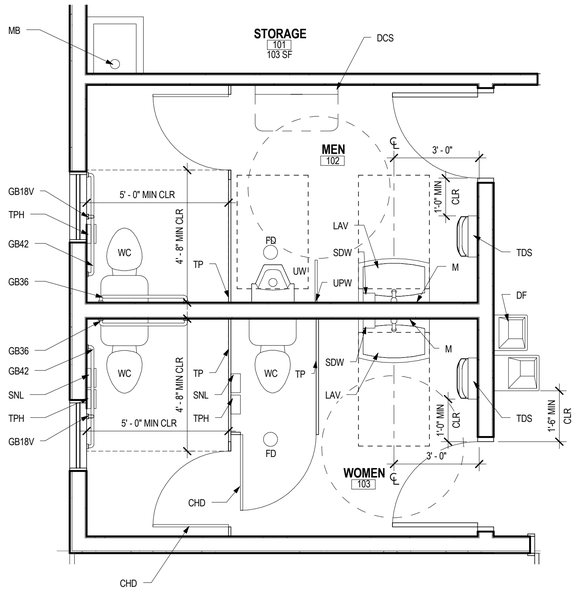
DOOR AND WINDOW TYPES AND ELEVATIONS

A6.1



9 ENLARGED RESTROOM PLAN

3/8" = 1'-0"

0' 8" 1'-4" 2'-8"

NORTH

ACCESSORY SCHEDULE -PUBLIC TOILET ROOMS

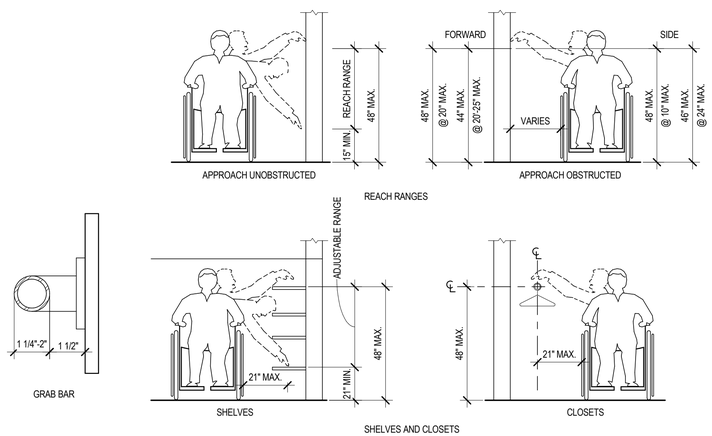
ABBREVIATION	ITEM	REMARKS
CHD	CLOTHES HOOK - MOUNTED ON PARTITION DOOR	-
DCS	DIAPER CHANGING STATION - WALL MOUNT	-
DF	DRINKING FOUNTAIN	HI-LO
FD	FLOOR DRAIN	-
GB18V	18" GRAB BAR - VERTICAL	-
GB36	36" GRAB BAR	-
GB42	42" GRAB BAR	-
LAV	LAVATORY	-
M	MIRROR	24" WIDE x 36" HIGH
MB	MOP BASIN	-
SDW	SOAP DISPENSER- WALL MOUNTED	-
SNL	SANITARY NAPKIN DISPOSAL	-
TDS	TOWEL DISPENSER w/ TRASH RECEPTACLE - SURFACE MOUNTED	-
TP	TOILET PARTITION	-
TPH	TOILET PAPER HOLDER	-
UPW	URINAL PARTITION	24" D X 48" H, WALL MOUNTED
UW	URINAL - WALL MOUNTED	-
WC	FLOOR-MOUNTED WATER CLOSET	-

SCHEDULE NOTES:

1. DCS BABY STATION TO BE 34" A.F.F. MAX. TO TOP OF SURFACE WHEN OPEN COMPLETELY

GENERAL NOTES:

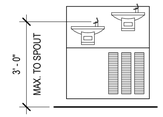
1. PROVIDE BLOCKING AS NECESSARY FOR MOUNTING THERMOSTATS, GRAB BARS, DOOR STOPS, FINISH CARPENTRY, AND TRIM CABINETS, SHELVING, AND ALL ACCESSORIES AND FIXTURES
2. DASHED ADA CLEARANCE AREA, CIRCLES, RECTANGLES SHOWN FOR INFORMATIONAL PURPOSES ONLY
3. REFER TO PLUMBING DRAWINGS FOR PLUMBING FIXTURES



3 ACCESSIBILITY REACH DETAILS

3/8" = 1'-0"

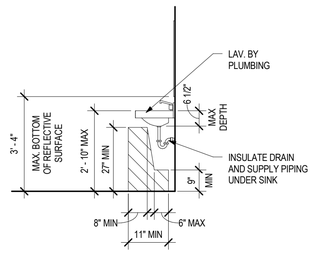
0' 8" 1'-4" 2'-8"



7 PUBLIC HI-LOW DRINKING FOUNTAIN FRONT ELEVATION

3/8" = 1'-0"

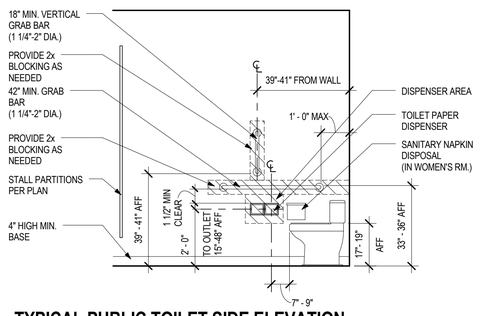
0' 8" 1'-4" 2'-8"



5 TYPICAL PUBLIC LAV. SIDE ELEVATION

3/8" = 1'-0"

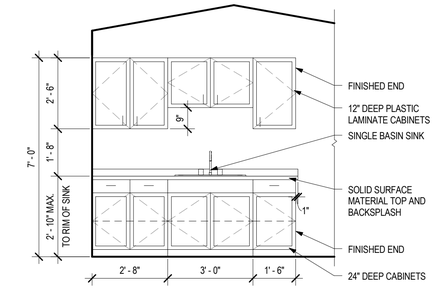
0' 8" 1'-4" 2'-8"



2 TYPICAL PUBLIC TOILET SIDE ELEVATION

3/8" = 1'-0"

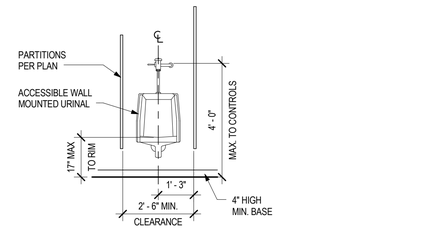
0' 8" 1'-4" 2'-8"



8 KITCHENETTE ELEVATION

3/8" = 1'-0"

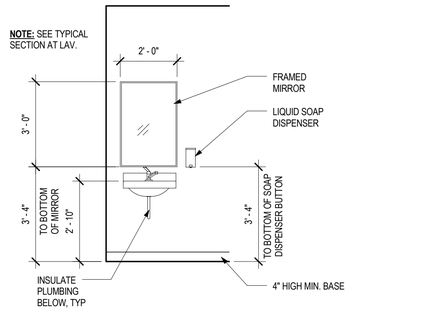
0' 8" 1'-4" 2'-8"



6 PUBLIC URINAL FRONT ELEVATION

3/8" = 1'-0"

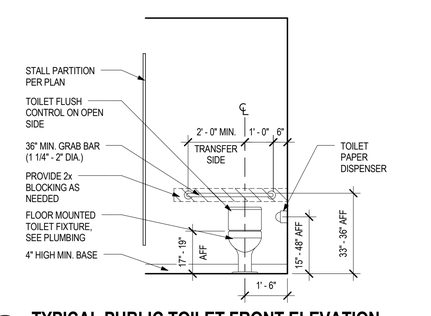
0' 8" 1'-4" 2'-8"



4 TYPICAL PUBLIC LAV. FRONT ELEVATION

3/8" = 1'-0"

0' 8" 1'-4" 2'-8"



1 TYPICAL PUBLIC TOILET FRONT ELEVATION

3/8" = 1'-0"

0' 8" 1'-4" 2'-8"

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SILVERWOOD STONE HOUSE - PHASE 2

771 SILVER LANE
EDGERTON, WI 53534

DATE OF ISSUE: 11/08/2017

REVISIONS:

PROJECT # 14099

ENLARGED ELEVATIONS

A7.0

FINISH LIST

ITEM:	SC-1	ITEM:	P-1
MANUFACTURER:		MANUFACTURER:	SHERWIN WILLIAMS
NUMBER:		NUMBER:	SW7035
COLOR:	CLEAR	COLOR:	AESTHETIC WHITE
DESCRIPTION:		DESCRIPTION:	
NOTES:		NOTES:	CEILING COLOR
ITEM:	SS-1	ITEM:	P-2
MANUFACTURER:	CORIAN	MANUFACTURER:	SHERWIN WILLIAMS
NUMBER:		NUMBER:	TBD
COLOR:	DEEP MINK	COLOR:	
DESCRIPTION:		DESCRIPTION:	
NOTES:		NOTES:	DOOR COLOR
ITEM:	WD-1	ITEM:	PL-1
MANUFACTURER:	MAPLE	MANUFACTURER:	WILSONART
NUMBER:		NUMBER:	10776-60
COLOR:	CLEAR	COLOR:	KENSINGTON MAPLE
DESCRIPTION:	POLYURETHANE	DESCRIPTION:	FLAT PANEL CABINETRY
NOTES:	EXISTING - PATCH, SAND, AND CLEAN	NOTES:	
	FLOOR PRIOR TO APPLYING FINISH		
ITEM:	FRP-1	ITEM:	VB-1
MANUFACTURER:	INPRO	MANUFACTURER:	JOHNSONITE
NUMBER:	0258	NUMBER:	
COLOR:	CHINO	COLOR:	PEPPERCORN
DESCRIPTION:		DESCRIPTION:	
NOTES:	FLOOR TO CEILING	NOTES:	
ITEM:	CG-1	ITEM:	STN-1
MANUFACTURER:	INPRO	MANUFACTURER:	
NUMBER:		NUMBER:	
COLOR:	MATCH FRP-1	COLOR:	
DESCRIPTION:	48" HIGH	DESCRIPTION:	
NOTES:		NOTES:	EXISTING STONE ON SITE
			GROUT COLOR: MATCH EXISTING

ROOM FINISH SCHEDULE

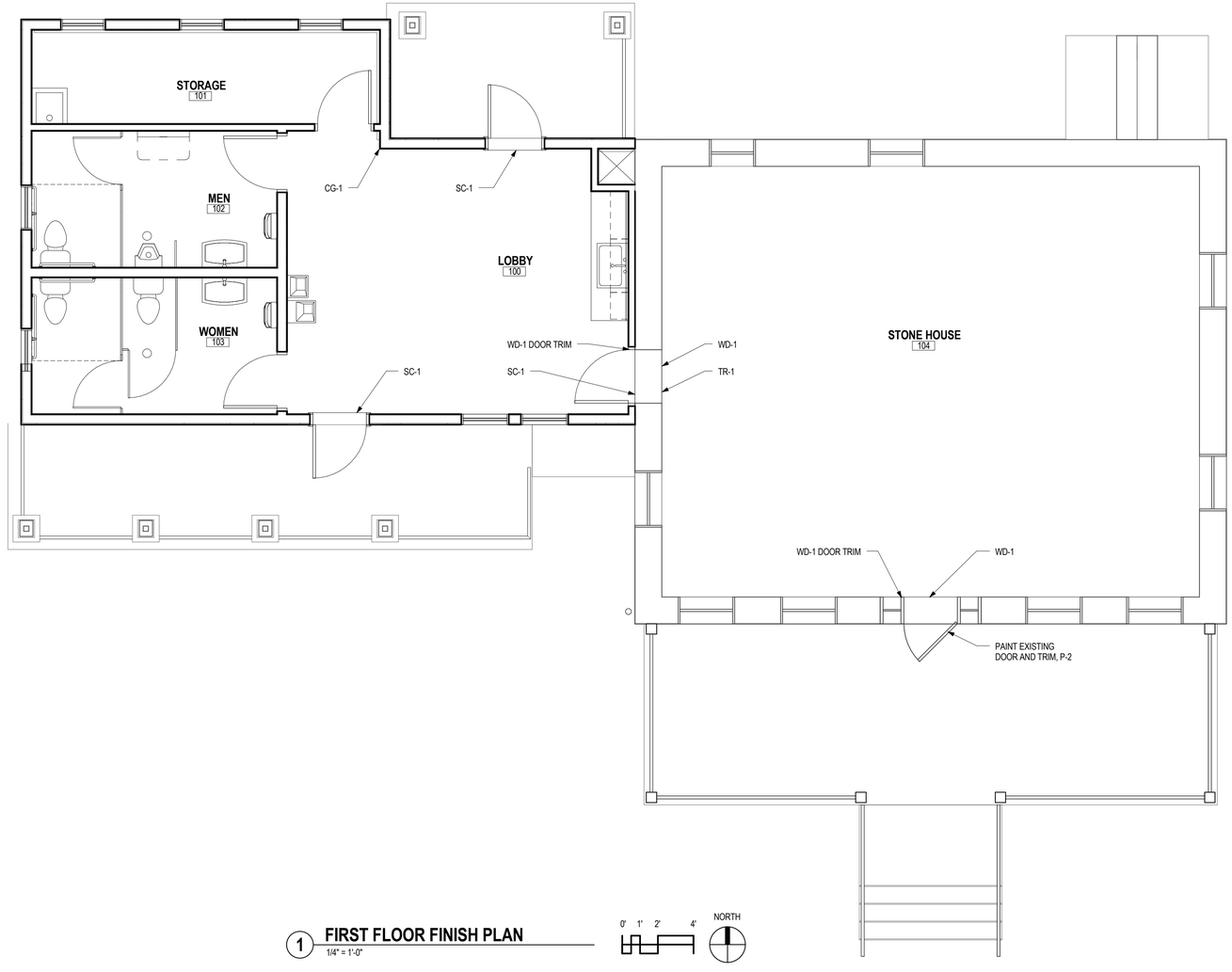
Location		Floor Finish		Wall Finish				Ceiling Finish		Cabinetry			Comments
Number	Name	Field	Base	North	East	South	West	Soffit	Ceiling Material	Base	Countertop	Upper	
BASEMENT													
001	BASEMENT	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING	EXISTING				
FIRST FLOOR													
100	LOBBY	SC-1	VB-1	FRP-1	FRP-1	FRP-1	FRP-1	FRP-1	P-1	PL-1	SS-1	PL-1	
101	STORAGE	SC-1	VB-1	FRP-1	FRP-1	FRP-1	FRP-1		P-1				
102	MEN	SC-1	VB-1	FRP-1	FRP-1	FRP-1	FRP-1	FRP-1	P-1				
103	WOMEN	SC-1	VB-1	FRP-1	FRP-1	FRP-1	FRP-1	FRP-1	P-1				
104	STONE HOUSE	EXISTING/WD-1	STN-1	EXISTING STN	EXISTING STN	EXISTING STN	EXISTING STN		EXISTING				

FLOOR FINISH GENERAL NOTES

A. PROVIDE TRANSITION STRIP BETWEEN DISSIMILAR FLOOR FINISHES, SEE SPECIFICATIONS FOR FURTHER INFORMATION

FINISH LEGEND

VCT	VINYL COMPOSITE TILE
SC	SEALED CONCRETE
WD	WOOD
VB	VINYL BASE
P	PAINT
GYP	GYPSUM BOARD
SS	SOLID SURFACE
PL	PLASTIC LAMINATE
GT	GROUT
STN	STONE
TR	TRANSITION STRIP
FRP	FIBER-REINFORCED PLASTIC
CG	CORNER GUARD



1 **FIRST FLOOR FINISH PLAN**
1/4" = 1'-0"

0' 1' 2' 4'

NORTH

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SILVERWOOD STONE HOUSE - PHASE 2

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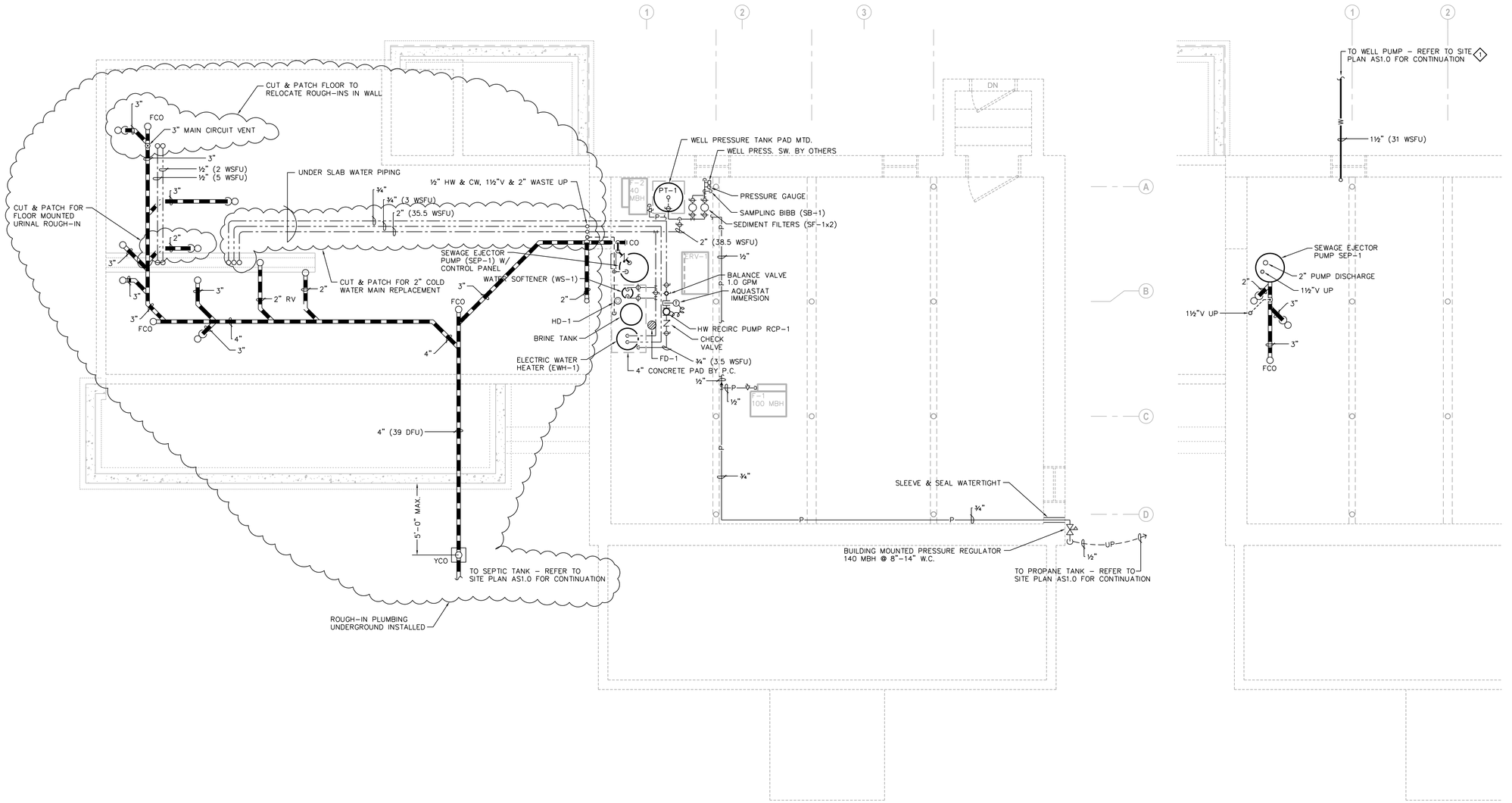
PROJECT # 14099

FLOOR FINISH PLANS

A9.0



1 **FIRST FLOOR UG AND BASEMENT PLAN - PLUMBING**
1/4" = 1'-0"

0' 1' 2' 4' NORTH

2 **BASEMENT UG PLAN - PLUMBING**
1/4" = 1'-0"

0' 1' 2' 4' NORTH

PLUMBING GENERAL NOTES:

1. PLUMBING CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL EXISTING CONDITIONS.
2. COORDINATE PIPING ROUTING WITH OTHER TRADES TO MAINTAIN SCHEDULED CEILING HEIGHTS.
3. COORDINATE FLOOR DRAINS & FLOOR MTD. FIXTURE LOCATIONS & MOUNTING HEIGHTS WITH THE GENERAL CONTRACTOR & THE CONCRETE FLOOR POUR.
4. REFER TO WATER, WASTE & VENT RISERS FOR PIPE SIZES AND LOCATIONS.

PLUMBING PLAN NOTES:

1. MAINTAIN 72" MINIMUM PIPE DEPTH FOR ALL EXTERIOR WATER PIPING. PROVIDE 1½" RIGID INSULATION (CLOSED CELL) COVERAGE FOR 3 FT WIDE AT ALL PIPING LESS THAN 72" BELOW GRADE.

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Project No. H1430

SILVERWOOD STONE HOUSE

771 Silver Lane
Edgerton, WI 53534

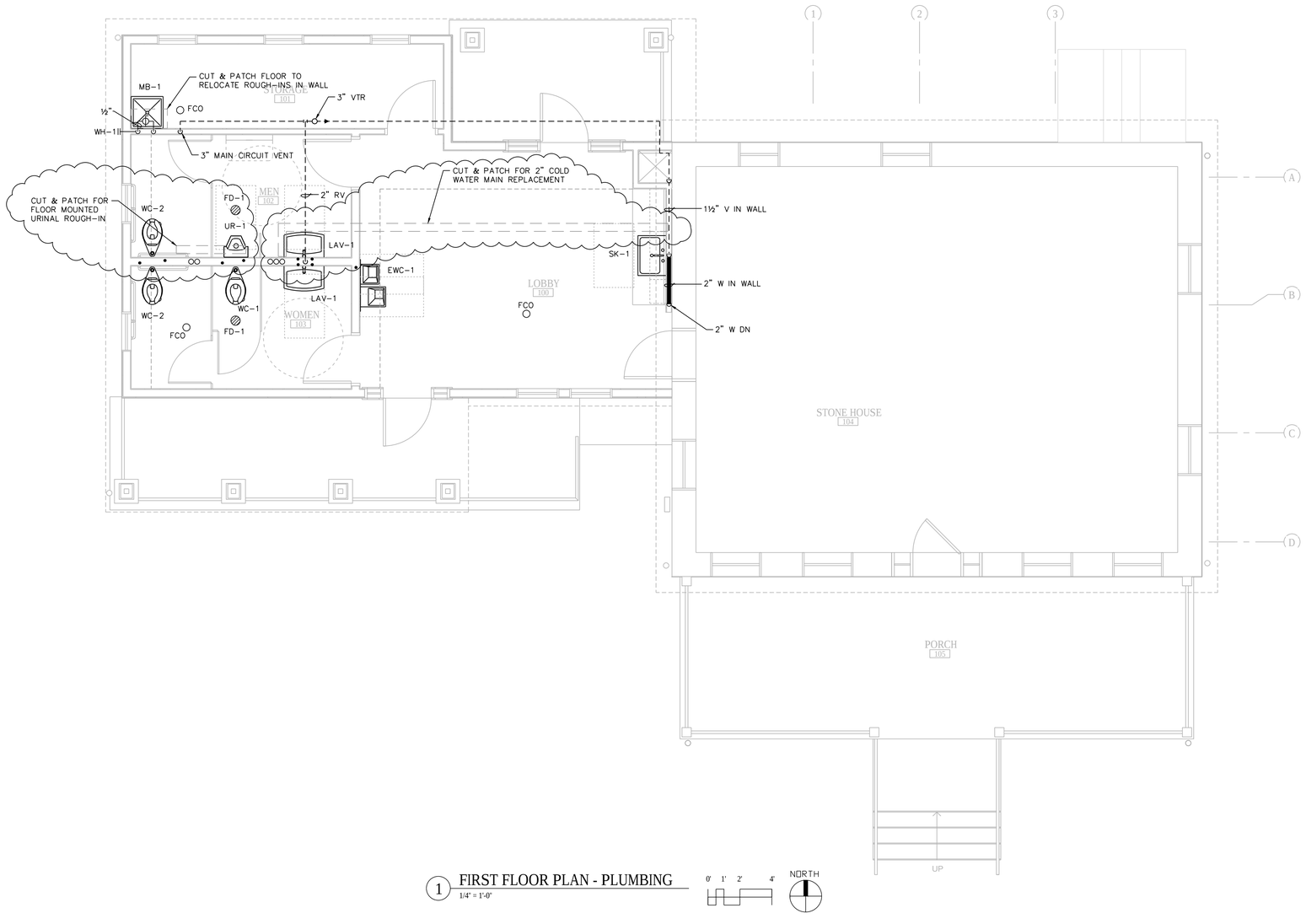
DATE OF ISSUE: 7-28-2017

REVISIONS:

PROJECT # 14099

BASEMENT & FIRST FLOOR UG PLANS - PLUMBING

P1.0



1 FIRST FLOOR PLAN - PLUMBING

1/4" = 1'-0"

PLUMBING GENERAL NOTES:

1. PLUMBING CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL EXISTING CONDITIONS.
2. COORDINATE PIPING ROUTING WITH OTHER TRADES TO MAINTAIN SCHEDULED CEILING HEIGHTS.
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4. REFER TO WATER, WASTE & VENT RISERS FOR PIPE SIZES AND LOCATIONS.

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Project No. H1430

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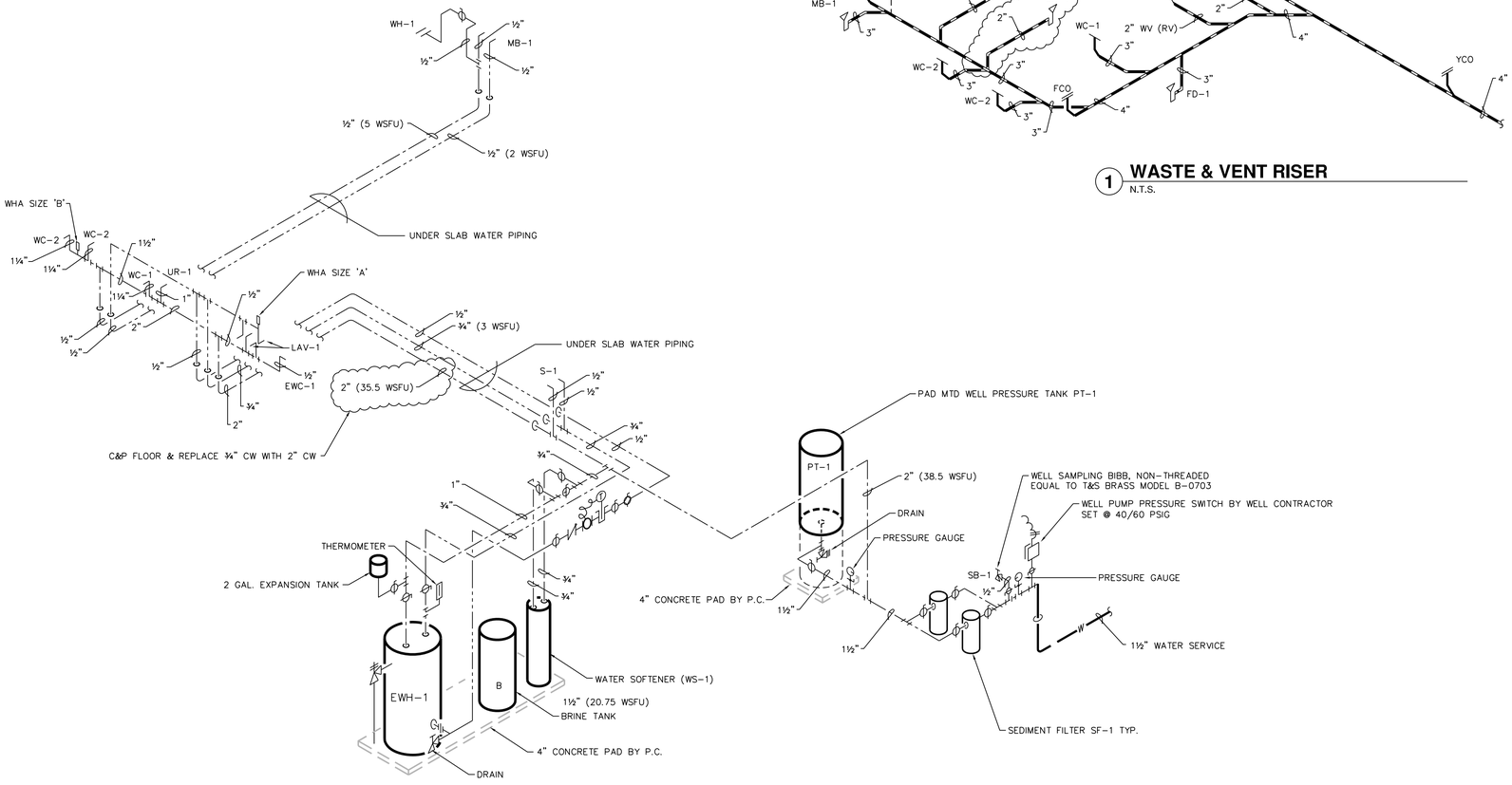
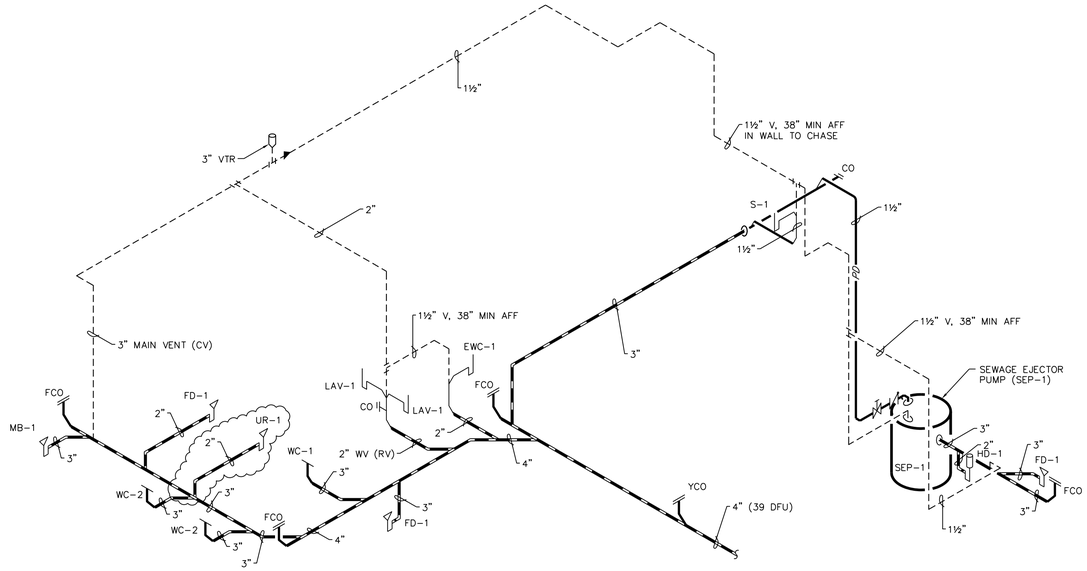
FIRST FLOOR PLAN - PLUMBING

P1.1



2 WATER PIPING RISER
N.T.S.



1 WASTE & VENT RISER
N.T.S.

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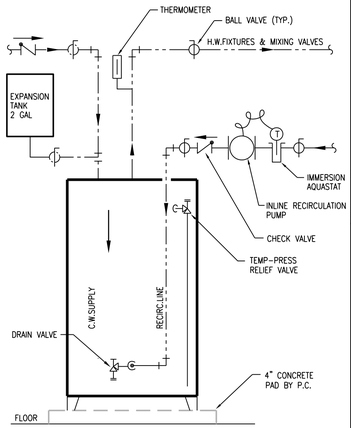
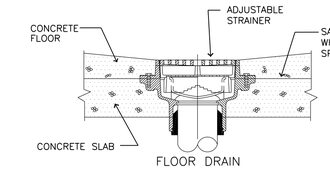
PLUMBING RISERS

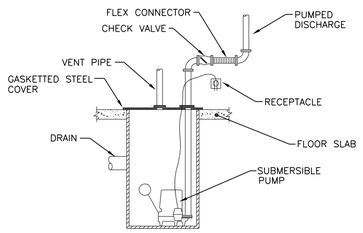
P2.0



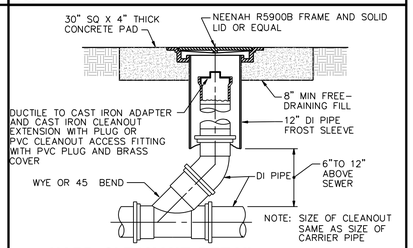
1 ELECTRIC WATER HEATER DETAIL
N.T.S.



2 FLOOR DRAIN DETAIL
N.T.S.



3 SIMPLEX SUMP AND PUMP DETAIL
N.T.S.



4 YARD CLEANOUT DETAIL
N.T.S.

PLUMBING FIXTURE SCHEDULE

P#	FIXTURE	WASTE	VENT	CW.	HW.	DESCRIPTION
WC-1	WATER CLOSET	4"	1-1/2"	1"	--	VITREOUS CHINA, WHITE, FLOOR-MTD. ELONGATED BOWL. 1-1/2" TOP SPUD, RIM @ 16-1/2" AFF FIXTURE EQUAL TO KOHLER HIGHCREST K-4302. SLOAN OPTIMA 8111 BATTERY-POWERED, SENSOR-OPERATED FLUSH VALVE (1.6 GPF) & BEMIS 1955-SSC OPEN FRONT SEAT.
WC-2	WATER CLOSET ADA	4"	1-1/2"	1"	--	SAME AS WC-1. ADA COMPLIANT.
UR-1	URINAL ADA	2"	1-1/2"	3/4"	--	VITREOUS CHINA, WHITE, FLOOR MTD, TOP SPUD, KOHLER BRANHAM MODEL K-4920-T WITH SLOAN 8186-1.0 BATTERY-POWERED, SENSOR-OPERATED FLUSH VALVE (1.0 GPF), K-9183 S.S. BEEHIVE STRAINER.
L-1	LAVATORY ADA	1-1/4"	1-1/2"	1/2"	1/2"	VITREOUS CHINA, WHITE, 20"x18-1/4" WALL HUNG EQUAL TO KOHLER CHESAPEAKE LAV K-1729, (2-HOLE 4" O.C.) W/SLOAN EBF-650-BDT BATTERY-POWERED, SENSOR-OPERATED (0.5 GPM) FAUCET, W/BELOW DECK MIXING VALVE, PROWRAP 2000 INSULATION GUARDS, CONCEALED ARM CARRIER EQUAL TO SMITH 0700 SERIES & KOHLER 8998 P-TRAP WITH CLEANOUT. ADA COMPLIANT.
S-1	HOSPITALITY SINK	1-1/2"	1-1/2"	1/2"	1/2"	STAINLESS STEEL SINGLE COMPARTMENT (16"x16"x7-5/8"D) SELF-RIMMING EQUAL TO ELKAY LR-2022, 4-HOLE, MCQUIRE 151A BASKET STRAINER, 1-1/2" TAIL PIECE, DELTA MODEL 400LF-HDF WITH 8-11/16" CENTERED SWING SPOUT & SINGLE LEVER CONTROL & SPRAY OFFSET TO THE RIGHT.
EWC-1	ELECTRIC WATER COOLER ADA	1-1/2"	1-1/2"	1/2"	1/2"	DUAL-LEVEL BARRIER FREE ELECTRIC WATER COOLER W/BOTTLE FILLING STATION, EQUAL TO ELKAY LZSTLG8WSLC. 8-GPM 115V/1ø/60, 4.2 FLA. ADA COMPLIANT.
MB-1	MOP BASIN	3"	1-1/2"	1/2"	1/2"	FLOOR-MOUNTED MOLDED STONE EQUAL TO MUSTEE MODEL #63M WITH #63.700 HOSE & HOSE HOLDER, #65.600 MOP HANGER & #67.2424 WALLGUARDS, CHICAGO 897 FAUCET WITH HOSE CONN. VB (WATTS 8A-ASSE 1011).
WH-1	EXTERIOR WALL HYDRANT	--	--	1/2"	--	WOODFORD MODEL 65 FREEZELESS WALL HYDRANT WITH HOSE CONN. VACUUM BREAKER FITTING & KEY OPERATED VALVE (ASSE 1011).
EWH-1	ELECTRIC WATER HEATER	--	--	3/4"	3/4"	FLOOR MOUNTED ELECTRIC WATER HEATER 30 GALLON CAPACITY, 21 GPH @ 90° F RISE, AO SMITH ECT-30, OR APPROVED EQUAL, 4500 WATT, 240V 1-PHASE, T&P RELIEF VALVE, R20 INSULATION. + 2 GAL EXPANSION TANK.
RCP-1	DWH RECIRC PUMP	-	-	-	3/4"	GRUNDFOS UP15-29SU (3 GPM @ 9 FT TDH) STAINLESS STEEL RECIRC. PUMP w/HONYWELL L4006A IMMERSION TYPE AQUASTAT (1/8 HP, 115V, 1ø 0.75 FLA).
S-1	WATER SOFTENER	OPEN SITE DRAIN	-	3/4"	-	HELLENBRAND MODEL PROMATE 6.0 OR APPROVED EQUAL. CAPACITY = 24,000 GRAIN, 0.75 CF RESIN, 9.8 GPM @ 10 PSIG MAX WPD. SOFTENER SIZE: 8"ø x44"H BRINE TANK: 18"ø x 40" H (300 LB. SALT CAP.). 3/4" VALVE/MANIFOLD, METERED DEMAND-CONTROLLED REGENERATION. 1.3 GPM BACKWASH RATE.
SF-1	SEDIMENT FILTER (2)	--	--	1-1/2"	--	INLINE CARTRIDGE FILTERS WITH 20 MICRON PLEATED FILTERS. 10" CARTRIDGE HEIGHT, EQUAL TO WATTS MODEL PWHSG-ASY-BB-10-BL1.5 (HOUSING) + PWFIL-SED-10-20M-PLT (FILTER).
PT-1	PNEUMATIC PRESSURE TANK	--	--	1-1/4"	--	PAD-MOUNTED, PNEUMATIC DIAPHRAM PRESSURE TANK (24"øx70"H). 110 gallon 0.31 ACCEPTANCE FACTOR. VERTICAL STEEL PRECHARGED, HYDRO-PNEUMATIC EXPANSION TANK, 125 PSIG ASME, BUTYL RUBBER BLADDER, NSF & FDA APPROVED. EQUAL TO AMTROL MODEL WX-406-C.
FD-1	FLOOR DRAIN	3"	1 1/2"	-	-	POLISHED BRONZE ADJ. ROUNDTOP EQUAL TO SMITH MODEL 2005Y-A-PB. (NO HUB), 2005L-A-PB (CAULKED OUTLET) & PROSET TG3H TRAP GUARD.
FCO	FLOOR CLEANOUTS	SEE FLOOR PLAN	-	-	-	PROVIDE SMITH 4025C ROUND NICKEL BRONZE TOP.
HD-1	HUB DRAIN	SEE FLOOR PLAN	1 1/2"	-		STUB UP WASTE HUB RIM OUTLET 4" AFF WITH HUB OPENING TWICE THE SIZE OF THE PIPE, OR AS NOTED ON PLANS.
SEP-1	SIMPLEX SEWAGE EJECTOR PUMP	3"	1-1/2"	--	--	POLYETHELENE BASIN 24"ø x 30" DEEP W/GASKETED SEALED METAL COVER. SUBMERSIBLE SIMPLEX PUMP W/CAST IRON MOTOR & PUMP HOUSING, 1-1/2" NON-CLOG IMPELLER, 1-1/2" DISCHARGE W/INLINE CHECK VALVE & ISOLATION VALVE. 19 GPM @ 15 FT. TDH. EQUAL TO ZOELLER MODEL M53 0.3 HP, 115 VOLT, 1-PHASE, 9.7 FLA EACH, SIMPLEX CONTROL PANEL WITH DISCONNECT, STARTER, HOA SWITCH, RUN & ALARM LIGHTS. NEMA, 3X ENCLOSURE.

PLUMBING SYMBOL SCHEDULE

SYMBOL	DESCRIPTION
	WASTE BELOW GROUND
	WASTE ABOVE GROUND
ST	STORM ABOVE GROUND
W	WATER SERVICE
	COLD WATER
	HOT WATER
	HOT WATER RECIRCULATION LINE
	VENT
	UNDERGROUND VENT
G	GAS LINE
	PIPE UP
	PIPE DOWN
CO	CLEAN OUT
	CALIBRATED BALANCE VALVE
	BALL VALVE
	INLINE PUMP
	CHECK VALVE
	UNION
G	GAS VALVE
YCO	YARD CLEAN OUT
FCO	FLOOR CLEAN OUT
WCO	WALL CLEAN OUT
HB	HOSE BIBB
CV	CIRCUIT VENT
WH	WALL HYDRANT
VTR	VENT THROUGH ROOF
FD	FLOOR DRAIN
HD	HUB DRAIN
RV	RELIEF VENT
RCP	DHW RECIRCULATION PUMP
UG	UNDERGROUND
UV	UNDERGROUND VENT
WHA	WATER HAMMER ARRESTOR
WV	WET VENT
WVR	WASTE & VENT RISER

WATER PIPING SIZING CHART (PEX/CPVC/COPPER)

	TYPE	COLD WATER @ 32.0 PSI/100'						HOT WATER @ 24.0 PSI/100'					
PIPE SIZE		½"	¾"	1"	1¼"	1½"	2"	½"	¾"	1"	1¼"	1½"	2"
PEX - WSFU	FM	-	-	5.5	9.0	25.0	80.0	-	-	-	-	-	-
PEX - WSFU	FT	5.0	14.0	25.5	45.0	78.3	185	4.0	14.0	25.5	45.0	78.3	185
COPPER - WSFU	FM	-	4.0	6.5	15.0	37.0	136	-	4.0	6.5	15.0	37.0	136
COPPER - WSFU	FT	6.5	16.5	31.0	58.0	107	260	6.5	16.5	31.0	58.0	107	260

WATER SERVICE SIZING:

1) 40 DEMAND OF BUILDING IN G.P.M.

2) 39.5 PSI AVAILABLE PRESSURE AFTER PRESSURE TANK

HOT WATER DISTRIBUTION SIZING:

PERMISSABLE UNIFORM PRESSURE LOSS FOR FRICTION (A): (P.S.I./100' OF PIPE)

WHERE: $A = \frac{B - (C + D + E)}{F} \times 100$

A. 33.8 PERMISSIBLE PRESSURE LOSS FOR FRICTION. (PSI/100' OF PIPE).

B. 39.5 PSI AVAILABLE PRESSURE AFTER INTERNAL PRESSURE TANK.

C. 8 PSI PRESSURE NEEDED AT CONTROLLING FIXTURE.

D. 1.3 PSI DIFFERENCE IN ELEVATION BETWEEN INTERNAL PRESSURE TANK AND CONTROLLING FIXTURE IN FEET 3 FT x .434 PSI/FT.

E. 15 PSI PRESSURE LOSS DUE TO WATER TREATMENT DEVICES AND WATER HEATER.

F. 45 FT DEVELOPED LENGTH FROM INTERNAL PRESSURE TANK TO CONTROLLING FIXTURE IN FEET 30 x 1.5.

COLD WATER DISTRIBUTION SIZING:

PERMISSABLE UNIFORM PRESSURE LOSS FOR FRICTION (A): (P.S.I./100' OF PIPE)

WHERE: $A = \frac{B - (C + D + E)}{F} \times 100$

A. 40.4 PERMISSIBLE PRESSURE LOSS FOR FRICTION. (PSI/100' OF PIPE).

B. 39.5 PSI AVAILABLE PRESSURE AFTER INTERNAL PRESSURE TANK.

C. 15 PSI PRESSURE NEEDED AT CONTROLLING FIXTURE.

D. 1.3 PSI DIFFERENCE IN ELEVATION BETWEEN INTERNAL PRESSURE TANK AND CONTROLLING FIXTURE IN FEET 3 FT x .434 PSI/FT.

E. 5 PSI PRESSURE LOSS DUE TO WATER TREATMENT DEVICES.

F. 45 FT DEVELOPED LENGTH FROM INTERNAL PRESSURE TANK TO CONTROLLING FIXTURE IN FEET 30 x 1.5.

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SILVERWOOD STONE HOUSE

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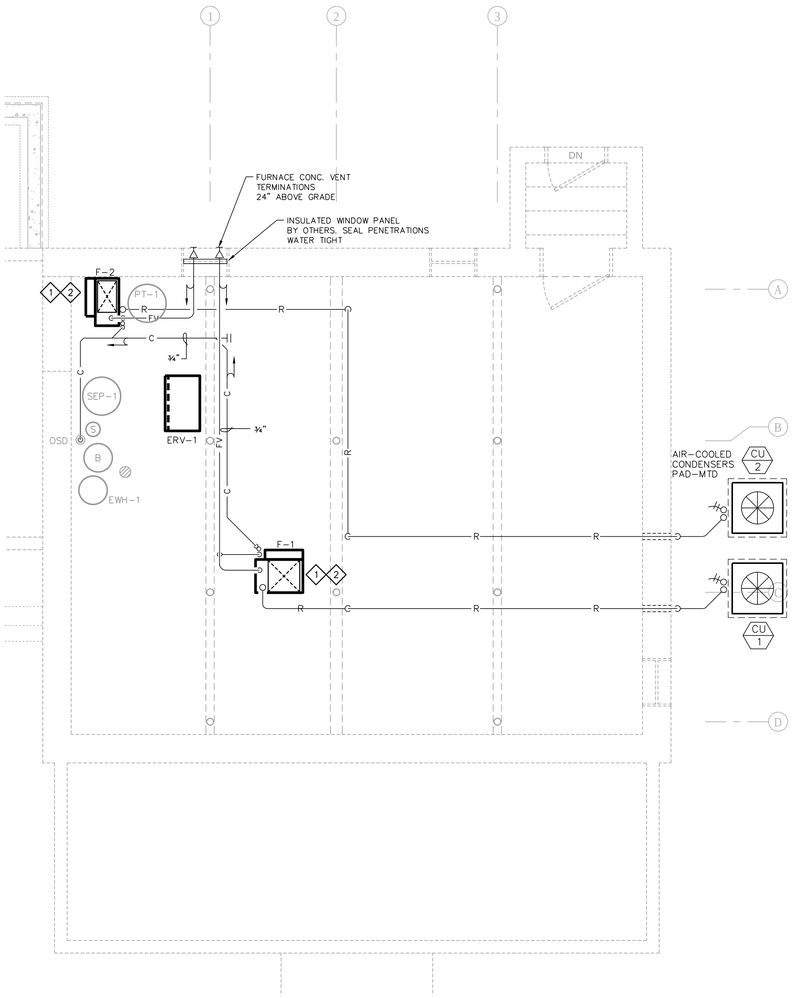
PROJECT # 14099

PLUMBING SCHEDULES & DETAILS

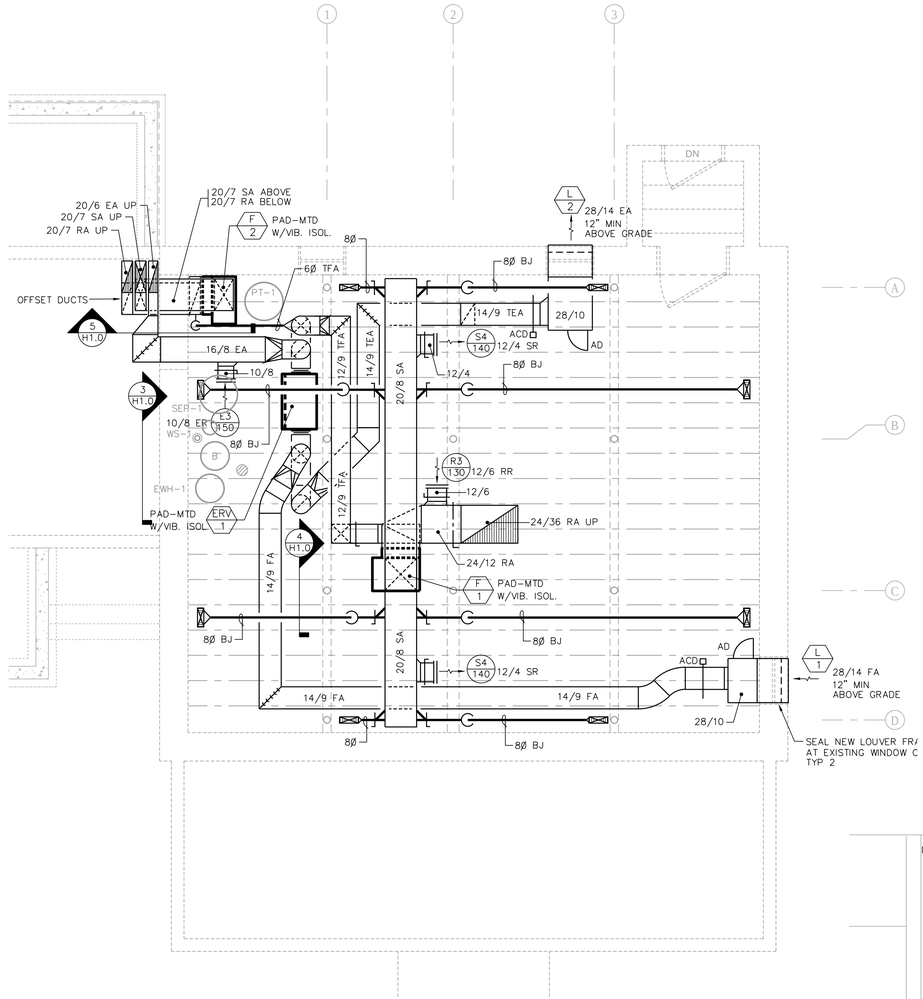
P3.0



1 BASEMENT PLAN - HVAC PIPING
1/4" = 1'-0"

0' 1' 2' 4'

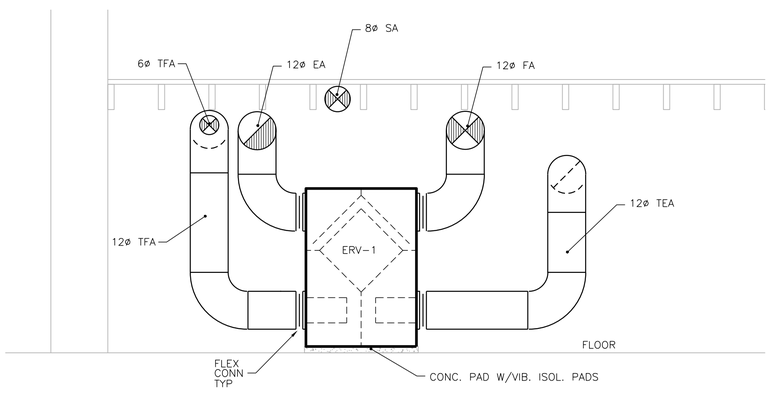
NORTH



2 BASEMENT PLAN - HVAC DUCTWORK
1/4" = 1'-0"

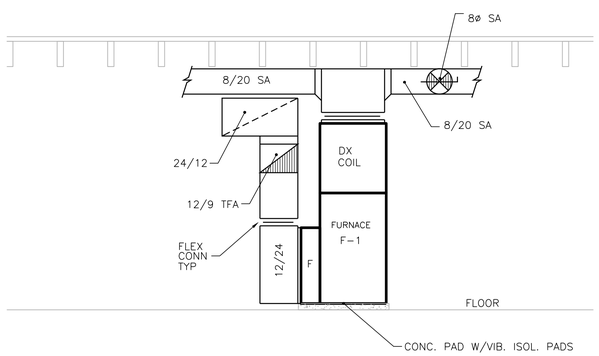
0' 1' 2' 4'

NORTH



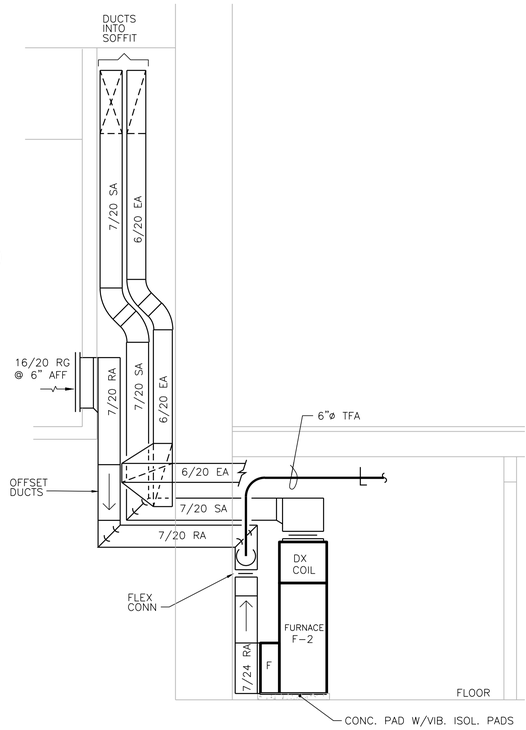
3 ENERGY RECOVERY VENTILATOR ERV-1 ELEVATION
1/2" = 1'-0"

0' 6" 1' 2'



4 FURNACE F-1 ELEVATION
1/2" = 1'-0"

0' 6" 1' 2'



5 FURNACE F-2 ELEVATION
1/2" = 1'-0"

0' 6" 1' 2'

HVAC GENERAL NOTES:

1. HVAC CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF HVAC WORK WITH OTHER TRADES.
2. COORDINATE PROVISIONS FOR OPENINGS IN NEW CONSTRUCTION WITH THE GENERAL CONTRACTOR FOR APPROVAL PRIOR TO STARTING WORK.
3. HVAC CONTRACTOR IS RESPONSIBLE FOR CUTTING AND PATCHING EXISTING WALLS, FLOORS & CEILING FOR NEW HVAC WORK, WHERE REQUIRED.
4. COORDINATE FINAL CEILING REGISTER AND GRILE LOCATIONS WITH OTHER TRADES.
5. COORDINATE PIPING AND DUCTWORK ROUTING WITH OTHER TRADES TO MAINTAIN SCHEDULED CEILING HEIGHTS.
6. PROVIDE PROPER SERVICE CLEARANCES AND ACCESS SPACE FOR ALL NEW EQUIPMENT.
7. PROVIDE ACCESS PANELS AT INACCESSABLE CEILINGS FOR EQUIPMENT, WHERE REQUIRED.

HVAC PLAN NOTES:

1. EXTEND FURNACE/DX COIL CONDENSATE PIPE TO OSD BY PLUMBING TRADE
2. EXTEND FURNACE COMBUSTION AIR/FLUE PIPING TO WALL TERMINATION WITH CONCENTRIC VENT AS SHOW.

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SILVERWOOD STONE HOUSE

771 Silver Lane
Edgerton, WI 53534

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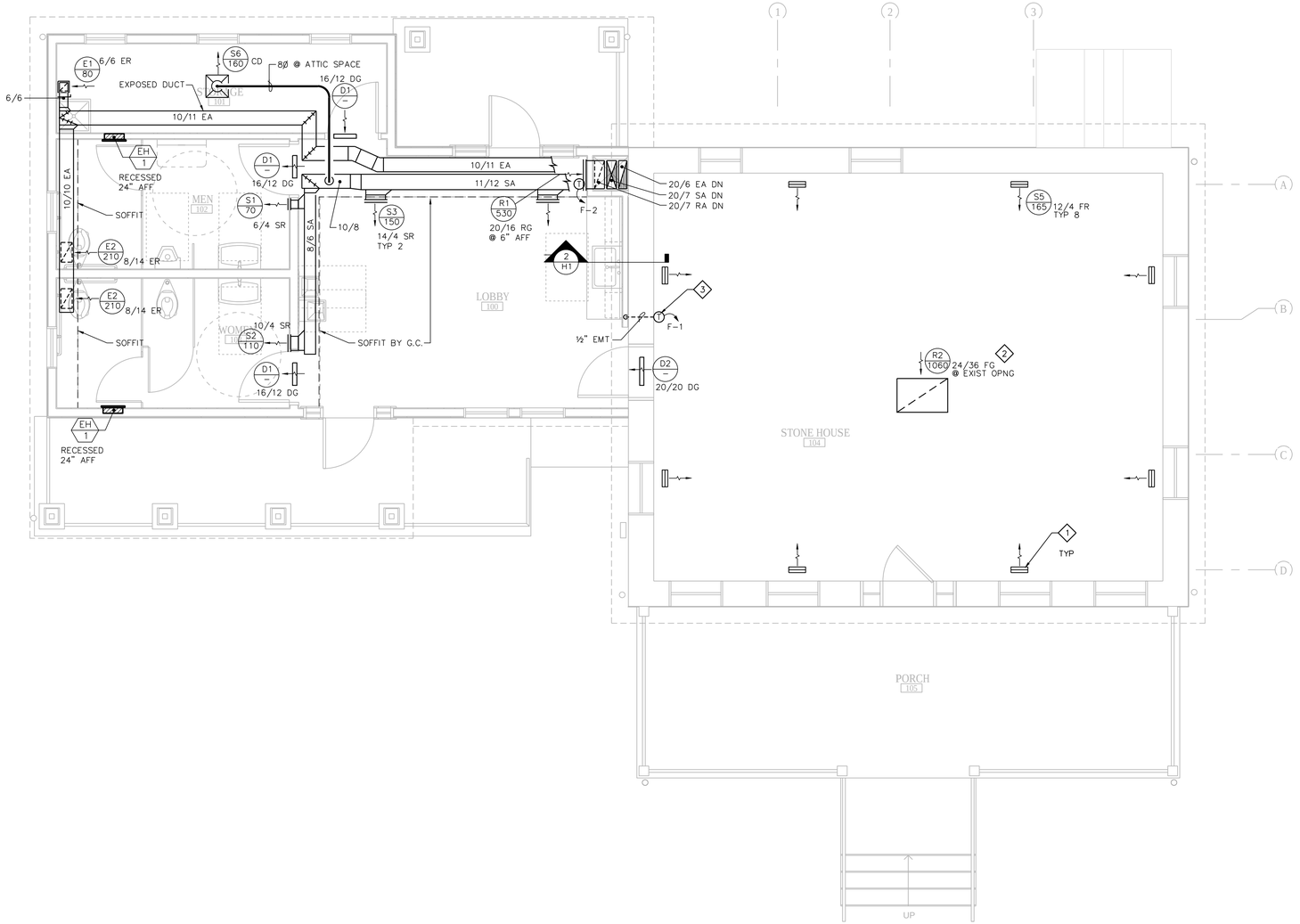
PROJECT # 14099

BASEMENT PLANS - HVAC

H1.0



1 FIRST FLOOR PLAN - HVAC
1/4" = 1'-0"

0' 1' 2' 4'

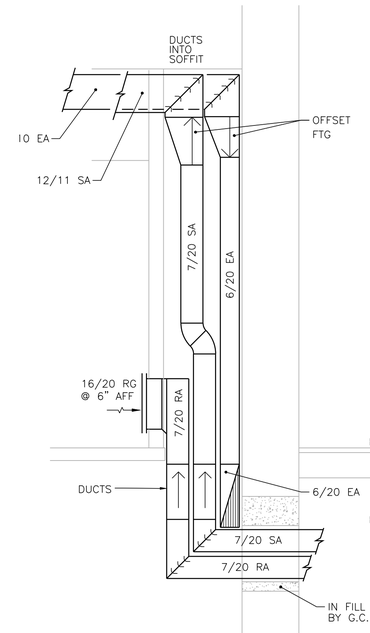
NORTH

HVAC GENERAL NOTES:

1. HVAC CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF HVAC WORK WITH OTHER TRADES.
2. COORDINATE PROVISIONS FOR OPENINGS IN NEW CONSTRUCTION WITH THE GENERAL CONTRACTOR FOR APPROVAL PRIOR TO STARTING WORK.
3. HVAC CONTRACTOR IS RESPONSIBLE FOR CUTTING AND PATCHING EXISTING WALLS, FLOORS & CEILING FOR NEW HVAC WORK, WHERE REQUIRED.
4. COORDINATE FINAL CEILING REGISTER AND GRILE LOCATIONS WITH OTHER TRADES.
5. COORDINATE PIPING AND DUCTWORK ROUTING WITH OTHER TRADES TO MAINTAIN SCHEDULED CEILING HEIGHTS.
6. PROVIDE PROPER SERVICE CLEARANCES AND ACCESS SPACE FOR ALL NEW EQUIPMENT.
7. PROVIDE ACCESS PANELS AT INACCESSABLE CEILINGS FOR EQUIPMENT, WHERE REQUIRED.

HVAC PLAN NOTES:

1. COORDINATE CUTTING EXISTING FLOOR OPENINGS WITH GENERAL CONTRACTOR.
2. COORDINATE FLOOR GRILLE OPENING WITH GENERAL CONTRACTOR.
3. ROUTE CONTROL WIRING IN EMT CONDUIT THRU MASONRY WALL DOWN TO BASEMENT.



2 LOBBY 100 DUCTWORK CHASE SECTION
1/2" = 1'-0"

0' 6" 1' 2'

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FIRST FLOOR PLAN - HVAC

H1.1

CONDENSING UNITS SCHEDULE

GENERAL: TAG	CU-1	CU-2
MANUFACTURER	CARRIER	CARRIER
MODEL NO.	24ACB3-48	24ACB3-18
REF. TYPE	R-410A (PURON)	R-410A (PURON)
COOLING CAP. MBH	46.0	17.5
AMBIENT TEMP.(F)	91	91
SEER (EER)	13.0 (11.0)	13.0 (11.0)
COND. DISCHARGE	VERTICAL	VERTICAL
COND. COIL AREA SF	21.56	9.85
COND. FAN CFM	3365	1880
REF. LINE SIZE: RS / RL	7/8" / 3/8"	5/8" / 3/8"
ELECTRICAL: VOLTAGE/PHASE	230/1	230/1
FAN F.L.A.	1.2	0.5
COMP. F.L.A.	19.9	9.0
MIN. CKT AMPS	26.2	11.8
MOCP AMPS	40	15
REMARKS:	①②③④⑤ SCROLL COMPRESSOR w/F-1	①②③④⑤ SCROLL COMPRESSOR w/F-2

① CRANKCASE HEATER.
② COMPRESSOR START-ASSIST CAPACITOR AND RELAY.
③ THERMOSTATIC EXPANSION VALVE (TXV) @ EVAPORATOR COIL.
④ LOW-AMBIENT OPERATION WITH CONDENSER FAN SPEED CONTROL (MOTOR MASTER).
⑤ BALL BEARING FAN MOTOR.

ELECTRIC HEAT SCHEDULE

TAG	MFGR	MODEL NO.	TYPE	SIZE HTxWxDEPTH	WATTS	CAP. BTU/HR	ELECTRICAL VOLTS/PHASE	ELECTRICAL AMPS	REMARKS
EH-1	Q-MARK	AWH-4404	RECESSED WALL HTR	18¼"x14⅜"x3⅜"	2000	6,825	240/1	8.3	①②③

① INTEGRAL TAMPER PROOF THERMOSTAT.
② BUILT-IN DISCONNECT SWITCH.
③ LFK-SFC: 14 GA SECURITY FRONT COVER.

LOUVER SCHEDULE

TAG	MANUFACTURER	MODEL	TYPE	METAL	LOUVER DEPTH x W x HT	FREE AREA S.F.	SERVICE	REMARKS
L-1	VENT PRODUCTS	2730-31-34	STAT.	EXT. ALUM.	4" x 28" x 14"	0.91	FRESH AIR	①② FLANGED FRAME ③ W/SUB-FRAME
L-2	VENT PRODUCTS	2730-31-34	STAT.	EXT. ALUM.	4" x 28" x 14"	0.91	EXHAUST AIR	①② FLANGED FRAME ③ W/SUB-FRAME

① BIRD SCREEN - ALUM.
② ALUM SUB-FRAME (BUCK FRAME).
③ POWDER COAT BAKED ENAMEL FINISH; FINAL COLOR SELECTION BY ARCHITECT.

ENERGY RECOVERY VENTILATOR SCHEDULE

GENERAL: TAG	ERV-1
MANUFACTURER	RENEWAIRE
MODEL NO.	HEX1XINV-ECM
ARRANGEMENT	INDOOR HORIZONTAL WALL-MTD
TYPE	ENTHALPIC STATIC PLATE
FROST CONTROL	N.R.
EXHAUST AIR; CFM	650
EXT. SP "w.g.	0.75
FAN HP (BHP)	0.75
RPM	1725
DRIVE	DIRECT
FRESH AIR; CFM	650
EXT. SP "w.g.	0.50
FAN HP (BHP)	0.75
RPM	1725
DRIVE	DIRECT
COOLING MODE: FRESH AIR EAT db/wb F	91/75
FRESH AIR LAT db/wb F	79.3/69.0
EXHAUST AIR EAT db/wb F	75/64
TOTAL (SENSIBLE) EFFECTIVENESS	58% (73%)
HEATING MODE: FRESH AIR EAT db F	-15
FRESH AIR LAT db F	47.0
EXHAUST AIR EAT db/wb F	70/51.5
SENSIBLE EFFECTIVENESS	73%
FILTERS: TYPE	2" T.A. 30% EFF. (MERV 8)
QTY/SIZES	(2) 20"x20"x2"
ELECTRICAL: VOLTAGE/PHASE	230/1
FLA	4.5+4.5
MCA	10.5
MOCP UNIT	15
REMARKS:	W/F-1&2 UNIT WT= 211 lbs ①②③④

① FLOOR UNIT MOUNTING WITH FLEXIBLE DUCT CONNECTORS.
② INTERLOCK HX WITH ASSOCIATED FURNACE UNIT OCCUPIED MODE.
③ PROVIDE DISCONNECT SWITCH WITH UNIT NON-FUSED.
④ ECM MOTOR WITH MANUAL SPEED CONTROL AT UNIT.

FURNACE UNIT SCHEDULE

GENERAL: TAG	F-1	F-2
MANUFACTURER	CARRIER	CARRIER
MODEL NO.	59TP5A 100E21-20	59TP5A 040E14-10
TYPE	VERTICAL SEALED COMB.	VERTICAL SEALED COMB.
ARRANGEMENT	UPFLOW SIDE RETURN	UPFLOW SIDE RETURN
FAN: CFM	1600	640
ESP ("WG)	0.80	0.80
SPEED	ECM-4/YELLOW	ECM-4/YELLOW
MIN. FA CFM (%) ③	540 (33.8%)	110 (17.2%)
DE COIL: MANUFACTURER	CARRIER	CARRIER
MODEL NO.	CNPVP-4821	CNPVP-1814
COIL APD ("WG)	0.26	0.17
COOLING CAP. (MBH)	46.0	17.5
SENSIBLE CAP. (MBH)	37	14.1
EAT DB/WB (deg F)	78/65	78/64.5
LAT DB/WB (deg F)	56.7/55.7	57.7/57.5
BONNET: ⑤ INPUT (MBH) HIGH/LOW	100/65	40/26
OUTPUT (MBH) HIGH/LOW	97/63	39/25
EAT DB (deg F)	60.8	66.0
LAT DB (deg F) HIGH/LOW	116.6/98.2	122.2/102.0
AFUE%	97%	97%
FILTER SECTION: TYPE ①	PLEATED (MERV 13)	PLEATED (MERV 13)
QUANTITY/AREA SF	1/34.0	1/23.1
SIZE: DIMENSIONS: WxHxD NOM	24 25"x24"x4½"	16 25"x16"x4½"
FILTER FRAME	EXTERNAL	EXTERNAL
ELECTRICAL: HORSEPOWER	1	1/2
VOLTAGE/PHASE	115/1	115/1
FAN FLA	12.6	6.8
UNIT FLA	13.5	7.5
MIN. CKT. AMP.	17.7	10.3
MOCP	20	15
REMARKS:	①②③④⑤ 4-TON UNIT	①②③④⑤ 1½-TON UNIT

① FILTER UNIT SHALL BE EQUAL TO MODEL EXPXXUNV03 SERIES.
② CONCENTRIC WALL VENTS.
③ FRESH AIR TEMPERED BY ERV.
④ MOUNT FURNACE ON VIBRATION ISOLATION PADS.
⑤ PROPANE GAS ORIFICE KIT.

DIFFUSERS, REGISTERS AND GRILLES SCHEDULE

TAG	MFGR	MODEL	SIZE NECK (WxH)	SIZE FACE (L)	MOUNTING	SERVICE	CFM	REMARKS
S1	CARNES	CTQBD	6"x4"	–	SURFACE/WALL	SUPPLY	70	①②③④ SR BAR GRILLE
S2	CARNES	CTQBD	10"x4"	–	SURFACE/WALL	SUPPLY	110	①②③④ SR BAR GRILLE
S3	CARNES	CTQBD	14"x4"	–	SURFACE/WALL	SUPPLY	150	①②③④ SR BAR GRILLE
S4	CARNES	RNGMV	12"x4"	–	DUCT	SUPPLY	140	①② SR ALUM SD
S5	CARNES	CCGBD	12"x4"	–	FLOOR	SUPPLY	165	②⑤ FR ALUM BAR GRILLE
S6	CARNES	SAFM-40	8"ø (9"x9")	–	SURFACE/CLG	SUPPLY	160	①② CD ALUM 4-WAY
R1	KEES	GHD40	20"x16"	–	WALL	RETURN	530	①② RR LOUVERED HD
R2	KEES	FHD40	24"x36"	–	FLOOR	RETURN	1060	①⑤ RG FLR LOUVERED HD
R3	CARNES	RNAMH	12"x6"	–	DUCT	RETURN	130	①② RR LOUVERED
D1	CARNES	RFJAD	16"x12"	–	DOOR	TRANSFER	–	⑤ FLANGED ALUM DG
D2	CARNES	RFJAD	20"x20"	–	DOOR	TRANSFER	–	⑤ FLANGED ALUM DG
E1	CARNES	RNJMH	6"x6"	–	CEILING	EXHAUST	80	①② LOUVERED ER ALUM.
E2	CARNES	RNJMH	8"x14"	–	CEILING	EXHAUST	210	①② LOUVERED ER ALUM.
E3	CARNES	RNJMH	10"x8"	–	DUCT	EXHAUST	150	①② LOUVERED ER ALUM.

CD = CEILING DIFFUSER
RG = RETURN GRILLE
RR = RETURN REGISTER
SG = SUPPLY GRILLE
SR = SUPPLY REGISTER
ER = EXHAUST REGISTER
HD = HEAVY DUTY

REMARKS:
① WHITE FINISH.
② OPPOSED BLADE DAMPER.
③ ALUM. BAR GRILLE.
④ CONCEALED MOUNTING HARDWARE.
⑤ POWDER COAT ENAMEL PAINT FINISH COLOR-SELECTED BY ARCHITECT.

HVAC SYMBOL SCHEDULE

SYMBOL	DESCRIPTION
100	EXHAUST CFM
	EQUIPMENT SYMBOL NO.
T	THERMOSTAT
S_{CO_2}	CARBON DIOXIDE SPACE SENSOR
	PIPING
FV	FURNACE VENTS
C	CONDENSATE PIPING
R	REFRIGERANT PIPING
	PIPE UP
	PIPE DOWN
	EQUIPMENT SYMBOLS
CU	CONDENSING UNIT
EF	EXHAUST FAN
ERV	ENERGY RECOVERY UNIT
EH	ELECTRIC HEATER
F	FURNACE
L	LOUVER
	ABBREVIATIONS
ACD	AUTOMATIC CONTROL DAMPER
EA	EXHAUST AIR
BOD	BOTTOM OF DUCT
OE	OPEN END DUCT
FA	FRESH AIR
MD	MOTORIZED BACKDRAFT DAMPER
TEA	TEMPERED EXHAUST AIR
TFA	TEMPERED FRESH AIR
RA	RETURN AIR
SA	SUPPLY AIR
AFF	ABOVE FINISHED FLOOR
Ø	ROUND DUCT DIAMETER
DG	DOOR GRILLE
TG	TRANSFER GRILLE
TD	TRANSFER DUCT
TCP	TEMPERATURE CONTROL PANEL
UC	UNDERCUT DOOR
VD	VOLUME DAMPER
	SQUARE/RECTANGULAR SUPPLY DIFFUSER, GRILLE OR REGISTER-HORIZONTAL MOUNT
	SQUARE/RECTANGULAR RETURN/EXHAUST REGISTER OR GRILLE-HORIZONTAL MOUNT
	SUPPLY REGISTER OR GRILLE VERT. MOUNT
	RETURN/EXHAUST REGISTER OR GRILLE VERT. MOUNT
	VERTICAL SUPPLY DUCT UP
	VERTICAL RETURN/EXHAUST DUCT UP
	VERTICAL SUPPLY DUCT DOWN
	VERTICAL RETURN/EXHAUST DUCT DOWN
	VOLUME DAMPER
FD AP	FIRE DAMPER W/ACCESS PANEL
ACD	AUTOMATIC CONTROL DAMPER
MD	MOTORIZED DAMPER
	FLEXIBLE CONNECTION
	ROUND/FLEXIBLE DUCT
	ROUND RIGID DUCT
	SQUARE ELBOW W/TURNING VANES
	RADIUS ELBOW, R/D = 1.5
	RADIUS TAKEOFF R/D = 1.5 "X"=TAKE-OFF WIDTH
	DUCT RISE(R) OR DROP(D)
A 100	DIFFUSER/REGISTER/GRILLE TYPE / CFM

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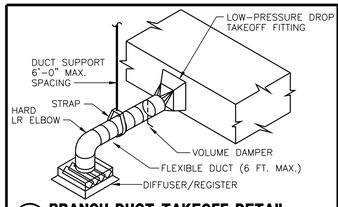
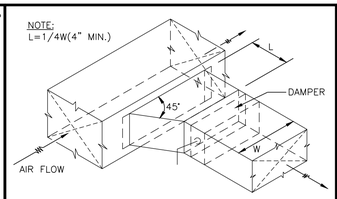
HVAC SCHEDULES

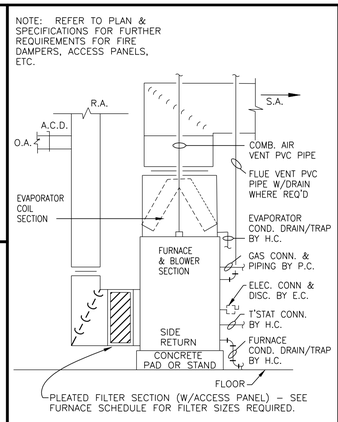
H2.0



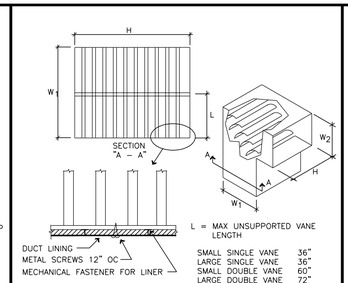
10 BRANCH DUCT TAKEOFF DETAIL-ROUND DL-2



7 BRANCH DUCT TAKEOFF DETAIL-RECTANGLE DL-1

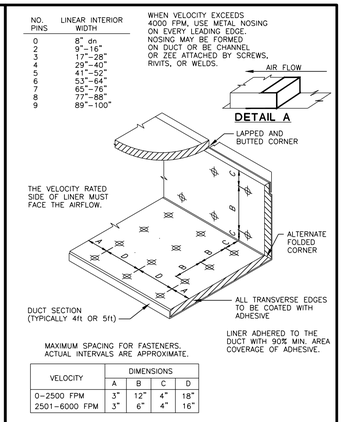


5 FURNACE SCHEMATIC - UPFLOW AD-18



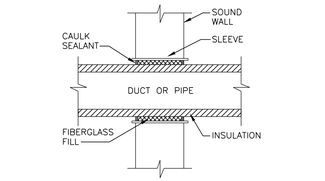
NOTES:
1. INSTALL VANES IN SECTIONS OR USE TIE RODS TO LIMIT UNBRACED VANE LENGTH
2. SECURELY FASTEN VANES TO RUNNERS TO ELIMINATE VIBRATION
3. PREVENT LINING DAMAGE WHEN INSTALLING VANES IN LINED OR FIBROUS GLASS DUCT

3 TURNING VANES IN ELBOW N.T.S. DL-55

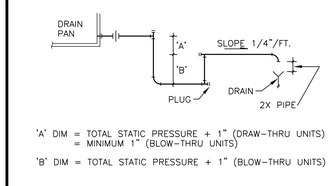


VELOCITY	DIMENSIONS			
	A	B	C	D
0-2500 FPM	3"	12"	4"	18"
2501-6000 FPM	3"	6"	4"	16"

1 DUCT LINER DETAIL DL-50

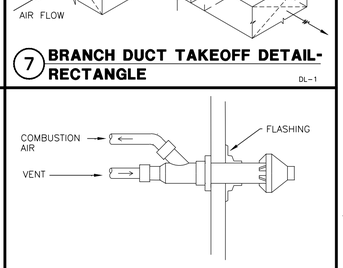


12 PIPE/DUCT SOUND WALL PENETRATION DETAIL DL-40

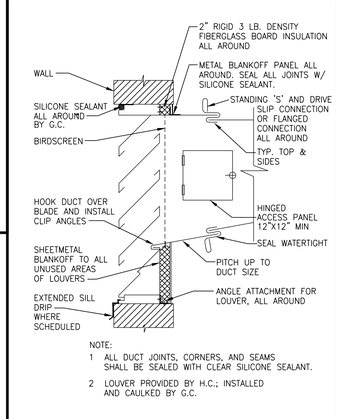


9 CONDENSATE DRAIN TRAP DETAIL HT-73

11 PIPE/DUCT FLOOR PENETRATION DETAIL DL-41

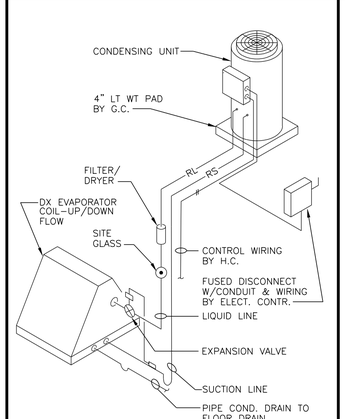


8 FURNACE WALL VENT DETAIL AD-48A

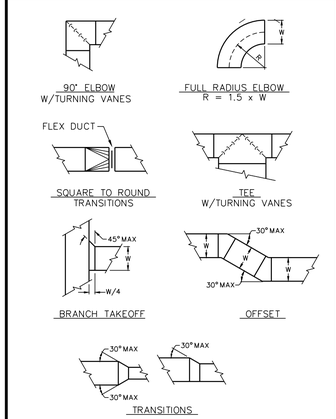


NOTE:
1. ALL DUCT JOINTS, CORNERS, AND SEAMS SHALL BE SEALED WITH CLEAR SILICONE SEALANT.
2. LOUVER PROVIDED BY H.C.; INSTALLED AND CAULKED BY G.C.

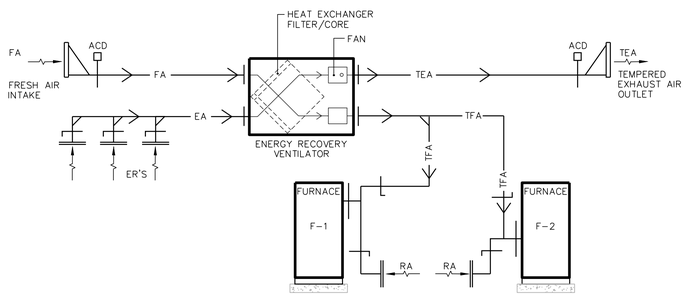
6 LOUVER DETAIL DL-115



4 DX COOLING COIL DETAIL UP/DOWN FLOW R-21



2 STANDARD DUCT FITTINGS J-1a



A ENERGY RECOVERY VENTILATOR (ERV) SCHEMATIC N.T.S.

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SILVERWOOD STONE HOUSE

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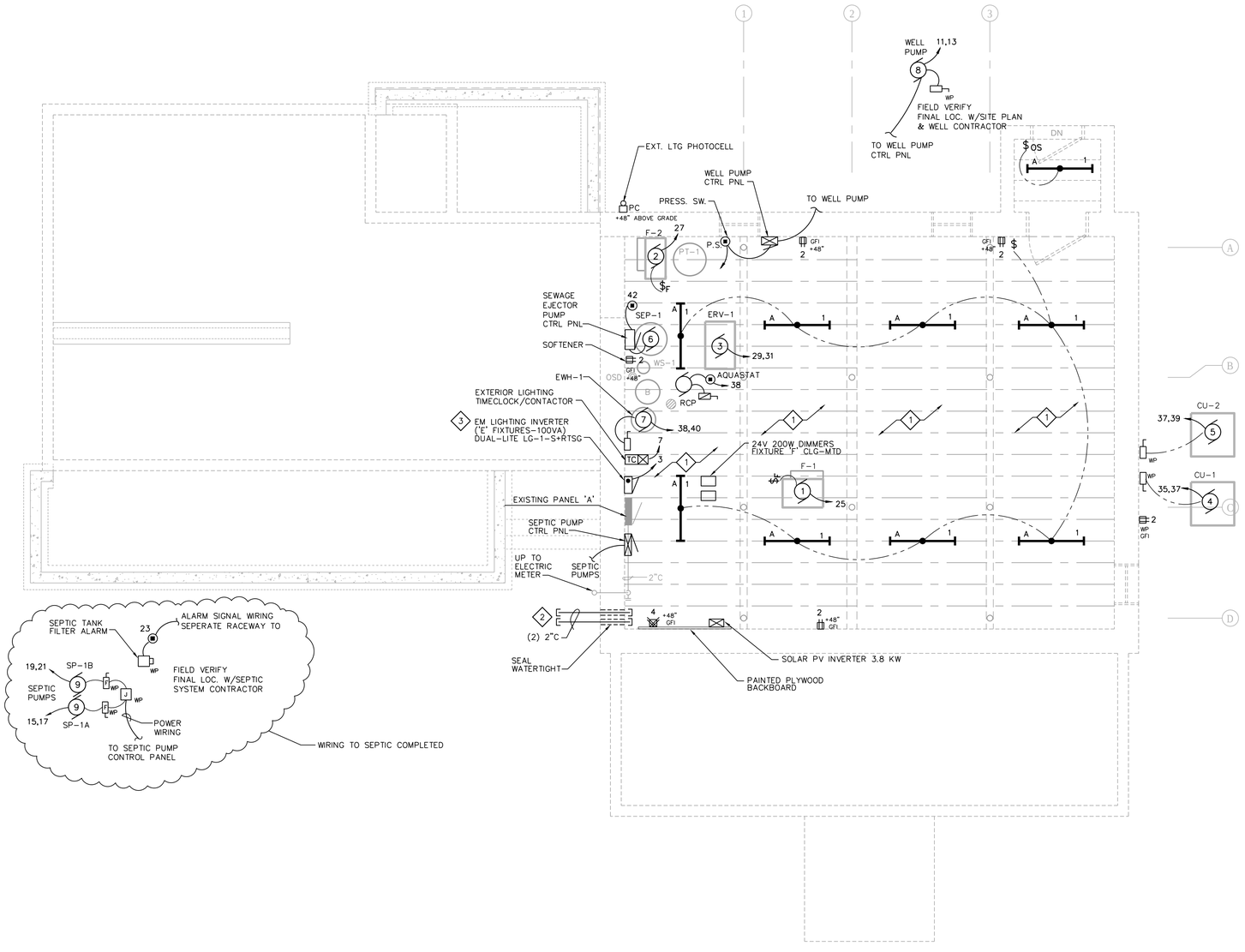
HVAC DETAILS

H3.0



1 BASEMENT PLAN - ELECTRICAL
1/4" = 1'-0"

0' 1' 2' 4'

NORTH

ELECTRICAL GENERAL NOTES:

1. COORDINATE LIGHTING & DEVICE LAYOUT WITH GENERAL CONTRACTOR.
2. COORDINATE ELECTRICAL RACEWAYS ROUTING WITH GENERAL CONTRACTOR AND OTHER TRADES FOR PROPER EQUIPMENT ACCESS.
3. ALL RACEWAYS ARE TO BE CONCEALED IN FINISHED AREAS. MECHANICAL & UTILITY AREAS MAY USE SURFACE CONDUIT SYSTEMS.
4. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL CONSTRUCTION CONDITIONS.
5. ALL LIGHTS CIRCUITED TO PANEL 'A' UNLESS INDICATED OTHERWISE.

ELECTRICAL POWER/LV PLAN NOTES:

1. COORDINATE LIGHT FIXTURE MOUNTING LOCATION AND SUSPENSION HEIGHT WITH DUCTWORK, PIPING & OTHER TRADES.
2. STUB OUT 2"(PVC) RACEWAY 24" BELOW GRADE AND CAPPED FOR FUTURE COMMUNICATIONS CABLING.
3. EXTEND EMERGENCY LIGHTING CIRCUIT TO 'E' FIXTURE ON MAIN LEVEL.

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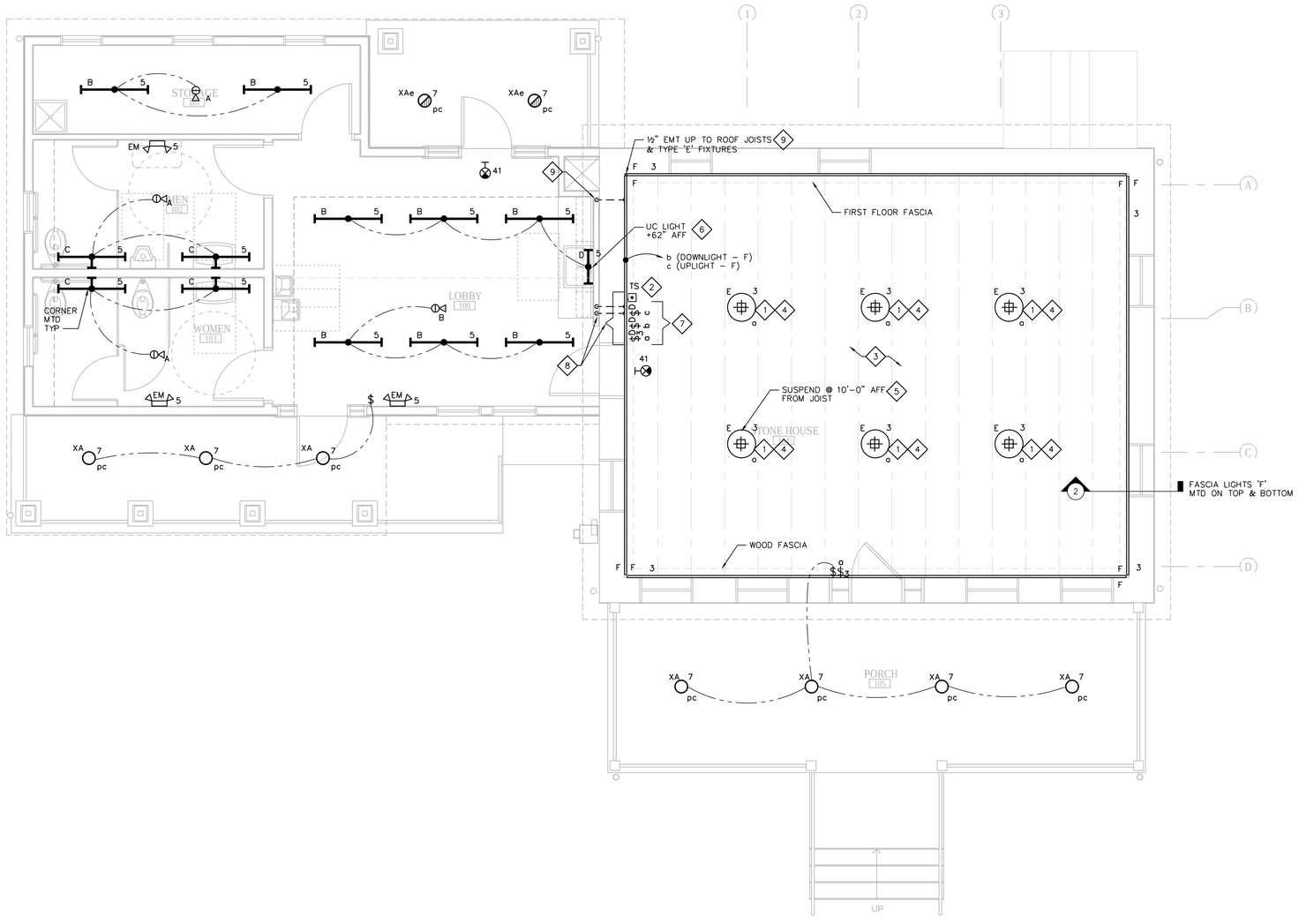
BASEMENT PLAN - ELECTRICAL

E1.0



1 FIRST FLOOR PLAN - ELECTRICAL LIGHTING
1/4" = 1'-0"

0' 1' 2' 4'

NORTH

ELECTRICAL GENERAL NOTES:

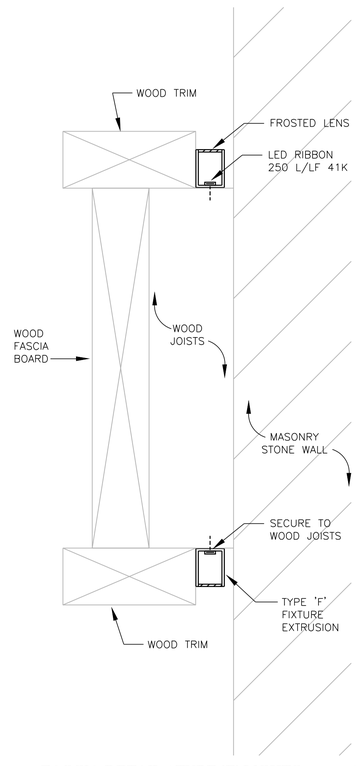
1. COORDINATE LIGHTING & DEVICE LAYOUT WITH GENERAL CONTRACTOR.
2. COORDINATE ELECTRICAL RACEWAYS ROUTING WITH GENERAL CONTRACTOR AND OTHER TRADES FOR PROPER EQUIPMENT ACCESS.
3. ALL RACEWAYS ARE TO BE CONCEALED IN FINISHED AREAS. MECHANICAL & UTILITY AREAS MAY USE SURFACE CONDUIT SYSTEMS.
4. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL CONSTRUCTION CONDITIONS.
5. ALL LIGHTS CIRCUITED TO PANEL 'A' UNLESS INDICATED OTHERWISE.

ELECTRICAL POWER/LV PLAN NOTES:

1. TYPE 'E' FIXTURE FED THROUGH MICRO INVERTER IN BASEMENT FOR EMERGENCY EGRESS LIGHTING.
2. EMERGENCY LIGHTING – REMOTE TEST SWITCH.
3. ROUTE LIGHTING CONDUCTORS THROUGH EXPOSED EMT CONDUIT–SURFACE MTD. IN STONE HOUSE.
4. SUPPORT STEM–MTD TYPE 'E' FIXTURES AT WOOD JOISTS ABOVE.
5. SUPPORT PENDANT FIXTURES FROM STEM MTD CANOPY/BOX FLUSH WITH SLOPED CEILING.
6. COORDINATE UNDERCOUNTER LIGHT WITH CASEWORK INSTALLATION.
7. WALL DIMMERS (ELV–LED): SYNERGY ISD–LV OR APPROVED EQUAL.
8. ROUTE CONDUIT FOR DIMMER SWITCHES & TEST SWITCH SURFACE BOXES THRU MASONRY & DOWN TO BASEMENT AT FURRED OUT WALL.
9. ROUTE POWER TO TYPE 'E' LIGHTS UP IN ½" EMT FROM FIRST FLOOR FASCIA AND DOWN TO BASEMENT AT FURRED OUT WALL.

DIMMER TYPES:

A 120 VAC LED: SYNERGY ISD–600–LV–120–WH
(E & F FIXTURES)



2 FASCIA DETAIL / TYPE 'F' LIGHTS
1" = 1"

0" ¼" ½" 1"

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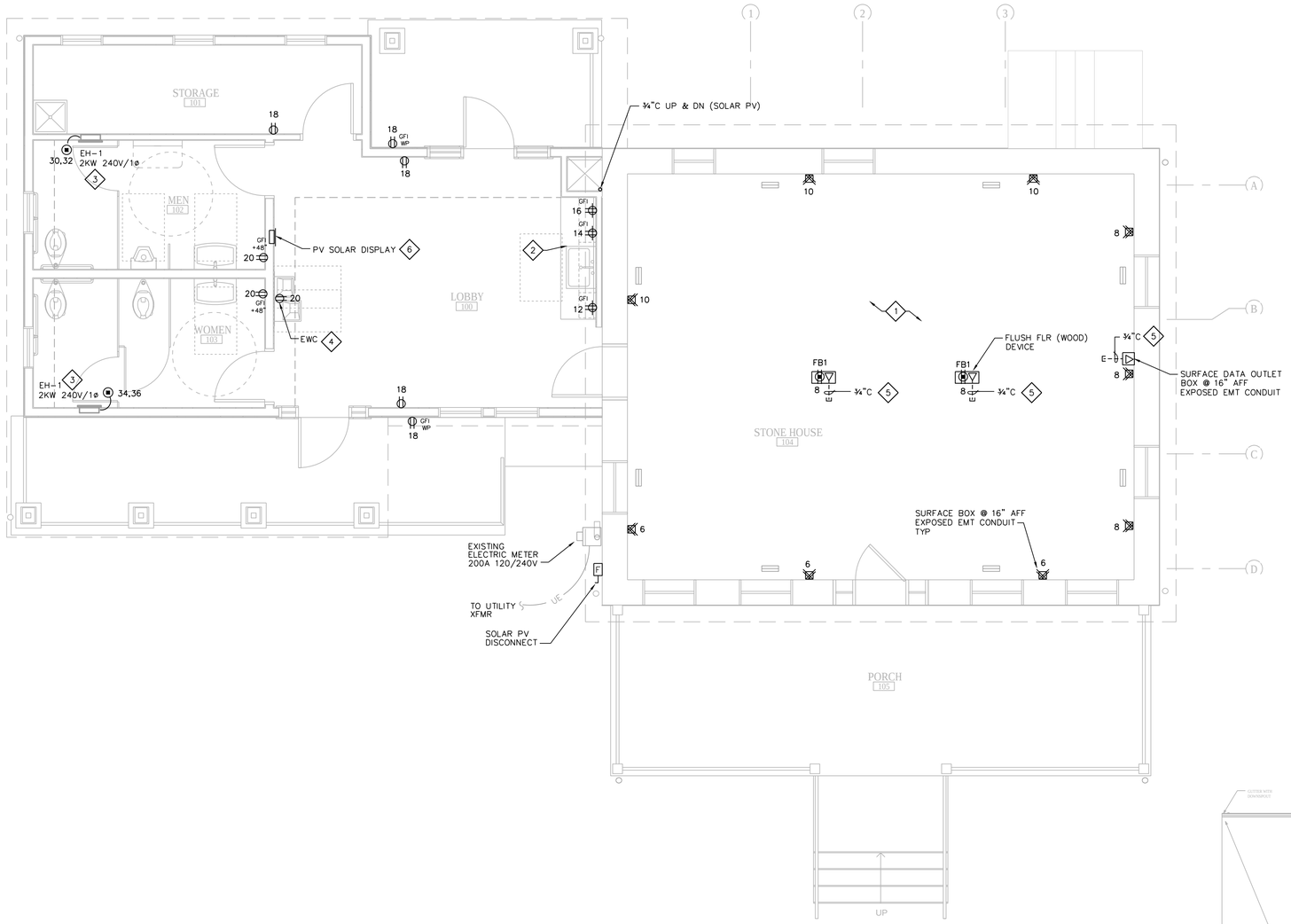
FIRST FLOOR PLAN - ELECTRICAL LIGHTING

E1.1



1 SECOND FLOOR PLAN - ELECTRICAL POWER/LV
1/4" = 1'-0"

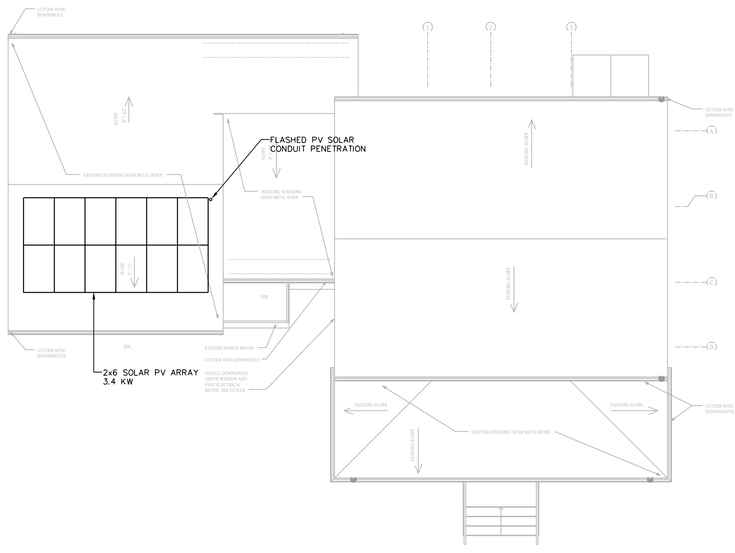
0' 1' 2' 4' NORTH

ELECTRICAL GENERAL NOTES:

1. COORDINATE LIGHTING & DEVICE LAYOUT WITH GENERAL CONTRACTOR.
2. COORDINATE ELECTRICAL RACEWAYS ROUTING WITH GENERAL CONTRACTOR AND OTHER TRADES FOR PROPER EQUIPMENT ACCESS.
3. ALL RACEWAYS ARE TO BE CONCEALED IN FINISHED AREAS. MECHANICAL & UTILITY AREAS MAY USE SURFACE CONDUIT SYSTEMS.
4. ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL CONSTRUCTION CONDITIONS.
5. ALL LIGHTS CIRCUITED TO PANEL 'A' UNLESS INDICATED OTHERWISE.

ELECTRICAL POWER/LV PLAN NOTES:

1. COORDINATE FINAL PLACEMENT OF FLOOR DEVICES WITH OWNER PRIOR TO INSTALLING.
2. COORDINATE DEVICE PLACEMENT WITH CASEWORK.
3. COORDINATE ELECTRIC ROUGH-IN LOCATIONS FOR ELECTRIC WALL HEATERS WITH HVAC CONTRACTOR.
4. COORDINATE FINAL RECEPTACLE LOCATION FOR ELECTRIC WATER COOLER ROUGH-IN WITH PLUMBING CONTRACTOR.
5. EXTEND ¾" COMMUNICATIONS CONDUIT STUB INTO BASEMENT WITH INSULATED BUSHING TERM. TYPICAL.
6. SOLAR PV DISPLAY BY PV CONTRACTOR.



2 SOLAR PV ROOF LAYOUT
1/8" = 1'-0"

0' 2' 4' 8' NORTH

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SECOND FLOOR PLAN - ELECTRICAL POWER/LV

E1.2

ELECTRICAL MOTOR/EQUIPMENT SCHEDULE

TAG	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
PANEL NO.	A	A	A	A	A	A	A	A	A
CIRCUIT	25	27	29,31	33,35	37,39	42	38,40	11,13	SEE PLAN
BREAKER (4)	20	15	15	40	15	(6) 20	30	30	(6) 15
POLE	1	1	2	2	2	1	2	2	2
WIRING NO. (1)	2+G (#12)	2+G (#12)	2+G (#12)	2+G (#10)	2+G (#12)	2+G (#12)	2+G(#10)	2+G (#10)	2+G (#12)
TYPE	THHN/CU	THHN/CU	THHN/CU	THHN/CU	THHN/CU	THHN/CU	THHN/CU	XHHW/CU	XHHW/CU
SIZE	#12	#12	#12	#8	#12	#12	#10	#10	#12
COND.	1/2"	1/2"	1/2"	3/4"	1/2"	1/2"	1/2"	3/4"	1/2"
ELECTRICAL HP (KW)	1	1/2	2 @ 3/4	(4.8)	(2.2)	0.3	(4.5)	2	1
VOLT	115	115	230	230	230	115	240	230	230
PHASE	1	1	1	1	1	1	1	1	1
FLA (MCA)	13.5 (17.7)	7.5 (10.3)	9.0 (10.5)	21.1 (26.2)	9.5 (11.8)	9.7 (12.1)	18.8 (23.5)	12.0 (15.0)	9.0 (11.3)
STARTER TYPE	W/UNIT	W/UNIT	w/UNIT	w/UNIT	w/UNIT	SEWAGE EJECTOR PUMP CONTROL PNL	w/UNIT	WELL PUMP CONTROL PANEL	SEPTIC PUMP CONTROL PANEL
SIZE	–	–	–	–	–	–	–	–	–
BY	H.C.	H.C.	H.C.	H.C.	H.C.	P.C.	P.C.	W.C.	S.C.
CONTROL TYPE	STAT	STAT	OCCUPIED CONTROL	STAT	STAT	FLOAT SWITCH	w/UNIT	PRESSURE SWITCH	LEVEL CONTROLS
BY	H.C.	H.C.	H.C.	H.C.	H.C.	P.C.	P.C.	W.C.	S.C.
DISCONNECT TYPE	F.T.S.	F.T.S.	W/UNIT	NEMA 3R HD	NEMA 3R HD	CONTROL PANEL	NEMA 1 HD	NEMA 3R HD	NEMA 3R HD
SIZE	20	15	–	30	30	–	30	30	30
FUSE (3)	20	15	–	–	–	–	–	–	12
BY	E.C.	E.C.	H.C.	E.C.	E.C.	P.C.	E.C.	W.C.	E.C.
REMARKS	FURNACE F-1 (4)	FURNACE F-2 (4)	ENERGY RECOVERY UNIT ERV-1 (4)	COND. UNIT CU-1 (4)	COND. UNIT CU-2 (4)	SEWAGE EJECTOR PUMP (5)	ELECTRIC WTR HTR EWH-1 (2)	WELL PUMP (2)	SEPTIC PUMPS SP-1A&1B (3)

E.C. = ELECTRICAL CONTRACTOR
H.C. = HVAC CONTRACTOR
P.C. = PLUMBING CONTRACTOR
G.C. = GENERAL CONTRACTOR
W.C. = WELL CONTRACTOR
S.C. = PRIVATE SEWAGE DISPOSAL (SEPTIC) CONTRACTOR

N.R. = NOT REQUIRED
G.D. = GENERAL DUTY
H.D. = HEAVY DUTY

H.D. = HEAVY DUTY
T.S. = TOGGLE SWITCH
F.T.S. = FUSED TOGGLE SWITCH
M.S. = MANUAL STARTER (FRAC HP)
T.U. = THERMAL UNIT

MAG = MAGNETIC STARTER
FVNR = FULL VOLTAGE NON-REVERSING
P.L. = PILOT LIGHT
H.O.A. = HAND-OFF-AUTO SWITCH
N.R. = NOT REQUIRED

(1) PROVIDE GREEN WIRE GROUND TO ALL MOTORS AND EQUIPMENT PER NEC 250-95.
(2) COORDINATE FINAL WIRING REQUIREMENTS FOR WELL PUMP, WELL CONTROL PANEL/CONTACTOR & PNEUMATIC TANK PRESSURE CONTROLS WITH WELL CONTRACTOR.
(3) COORDINATE FINAL WIRING REQUIREMENTS FOR SEPTIC PUMP, PUMP CONTROL PANEL & ALARMS WITH PRIVATE SEWAGE DISPOSAL (SEPTIC) CONTRACTOR.
(4) COORDINATE FINAL HVAC EQUIPMENT LOCATIONS & WIRING REQUIREMENTS WITH HVAC CONTRACTOR.
(5) COORDINATE FINAL WIRING REQUIREMENTS FOR SEWAGE EJECTOR PUMP, CONTROL PANEL AND ALARMS WITH PLUMBING CONTRACTOR.
(6) GFI CIRCUIT BREAKER.

PANEL (EXISTING) 'A'

AMPS MAIN: 200 / 200
VOLTS / PHASE: 120/240 / 1
MOUNTING LOCATION: SURFACE / BASEMENT

	BRKR A	BRKR P	DESCRIPTION	CIRCUIT WATT	CIRCUIT NO.	PHASELOADS A	PHASELOADS B	CIRCUIT NO.	CIRCUIT WATT	DESCRIPTION	BRKR A	BRKR P
	20	1	LIGHTS – BASEMENT	540	1	1440		2	900	RECEPT – BASEMENT	20	1
	20	1	LIGHTS – STONE HOUSE	450	3		810	4	360	RECEPT – BASEMENT COMM	20	1
	20	1	LIGHTS – ADDITION	750	5	2190		6	1440	RECEPT – STONE HOUSE	20	1
	20	1	EXT LIGHTS	50	7		1310	8	1260	RECEPT – STONE HOUSE	20	1
					9	1260		10	1260	RECEPT – STONE HOUSE	20	1
	30	2	WELL PUMP	1400	11		2900	12	1500	RECEPT – LOBBY KIT	20	1
	–	–	WELL PUMP	1400	13	2900		14	1500	RECEPT – LOBBY KIT	20	1
*	15	2	SEPTIC PUMP SP-1A	1040	15		2540	16	1500	RECEPT – LOBBY KIT	20	1
	–	–	SEPTIC PUMP SP-1A	1040	17	1940		18	900	RECEPT – LOBBY	20	1
*	15	2	SEPTIC PUMP SP-1B	1040	19		2000	20	960	RECEPT – EWC + TOILETS	20	1
	–	–	SEPTIC PUMP SP-1B	1040	21	1040		22				
*	20	1	SEPTIC ALARM	100	23		100	24				
	20	1	FURNACE F-1	1500	25	1500		26	–	SOLAR PV	20	2
	15	1	FURNACE F-2	860	27		860	28	–	SOLAR PV	–	–
	15	2	ERV-1	1040	29	2040		30	1000	EH-1 @ MEN	15	2
	–	–	ERV-1	1040	31		2040	32	1000	EH-1 @ MEN	–	–
	40	2	CU-1	2400	33	3400		34	1000	EH-1 @ WOMEN	15	2
	–	–	CU-1	2400	35		3400	36	1000	EH-1 @ WOMEN	–	–
	15	2	CU-2	1100	37	3350		38	2250	EWH-1 + RCP	30	2
	–	–	CU-2	1100	39		3350	40	2250	EWH-1	–	–
	20	1	EXIT LIGHTS	10	41	1120		42	1110	SEP-1	20	1
						22,180	19,310					

ESTIMATED DEMAND LOAD: 36,680 WATTS / 152.8 AMPS
TOTAL CONNECTED LOADS: 41,490 WATTS / 172.9 AMPS

* GFI CB

LIGHTING FIXTURE SCHEDULE

TAG	NO.	TYPE	LAMPS WATTS	LAMPS DESCRIPTION	MOUNTING	MFGR. & MODEL	REMARKS
A	–	LED	42	W/FIXTURE	SURFACE	LITHONIA – ZL1D-L48-5000LM-FST-MVOLT-40K-80 CRI-WH	(1) 4FT SURFACE UTILITY LIGHT 5500L, 40K
B	–	LED	49	W/FIXTURE	SURFACE	KENALL – MLHA12-48-F-MW-PP-45L40K-LED-DCC-1-120	(1) 4FT SURFACE WRAPAROUND VR 5300L,40K
C	–	LED	50	W/FIXTURE	SURFACE/ WALL BATH	KENALL – MLHA8-48-F-MW-PP-45L40K-LED-DDC-1-120-CMB	(1)(2) 4FT WALL BRACKET VR CORNER MTG 4500L,40K
D	–	LED	10	W/FIXTURE	SURFACE/ UC	LITHONIA – UCEL-24-40K-90 CRI-WH	(1) 2FT UNDERCOUNTER LIGHT 740L,40K
E	–	LED	36	W/FIXTURE	PENDANT 72" STEM	LURALINE – CS20-STEM72-SE-TL36 COB-WG-TAL	(1)(7)(8) (9)(12) 20"ø x102"H DECORATIVE PENDANT 5300L, 40K PRISMATIC GLASS, WIRE GUARD
F	–	LED	1.8	W/FIXTURE	SURFACE	OMNILIGHT – GEN-41-SO-CC (TAPE)+PSP-200-E-24 (POWER SUPPLY/DRIVER)+OCH-SCS-2M-FR (EXTRUSION W/FROSTED LENS)	(1)(8)(9) (10) FASCIA ACCENT LED RIBBON LIGHT 250L/FT, 40K
XA	–	LED	14	w/FIXTURE	RECESSED/ SOFFIT	LITHONIA – REAL6CD6-BN-ESL-1000L-40K-0.95SC-120-6VLR 1000L-ISH	(3)(5) 6"ø LED SOFFIT DOWNLIGHT WET LOC. + INSECT SCREEN
XAe	–	LED	14	w/FIXTURE	RECESSED/ SOFFIT	LITHONIA – REAL6CD6-BN-ESL-1000L-40K-0.95SC-120-6VLR 1000L-ELR-ISH	(3)(5)(6) 6"ø LED SOFFIT DOWNLIGHT WET LOC. + INSECT SCREEN W/BATTERY BACKUP
EM	–	LED	3	w/FIXTURE	SURFACE	LITHONIA – ELM2-LED	(3)(6) EMERGENCY EGRESS LIGHT W/BATTERY BACKUP
	–	LED	–	W/FIXTURE	SURFACE	LITHONIA – TLE-1-G-ELN	(1)(4)(6) EXIT LIGHT W/BATTERY BACKUP

LAMP ABBREVIATIONS:
LED=LIGHT EMITTING DIODE
F=FLUORESCENT
CF=COMPACT FLUORESCENT
TH=TUNGSTEN HALOGEN
IN=INCANDESCENT
MH=METAL HALIDE

REMARKS:
(1) LED LAMPING + DRIVER.
(2) CORNER MTG BRACKET (CMB).
(3) –
(4) CONTRACTOR TO PROVIDE SINGLE OR DOUBLE PANEL EXIT FACE AS REQ'D. AND MOUNT FIXTURE AS INDICATED ON DWGS.
(5) WET-LOC. UL LISTED.
(6) BATTERY BACKUP EMERGENCY LIGHTING.
(7) FINAL FINISH COLORS TO BE SELECTED BY ARCHITECT FROM STD FIXTURE COLORS AVAILABLE.
(8) DIMMING LED DRIVER (ELV OR 120 VAC-TRIAC).
(9) WALL DIMMER (ELV): SYNERGY ISD-600-LV OR APPROVED EQUAL.
(10) PROVIDE TAPE EXTRUSION LENGTHS AND ACCESSORIES FOR MOUNTING LED TAPE LIGHT AS CONFIGURED ON ELECTRICAL AND ARCHITECTURAL DRAWINGS.
(11) PROVIDE FITTINGS AND CONNECTIONS AS REQUIRED TO PROVIDE ARRANGEMENT AS SHOWN ON DRAWINGS. STEM HUNG WITH POWER FEED FROM WOOD JOISTS.
(12) 'E' FIXTURE PROVIDED WITH BATTERY BACKUP POWER FOR EMERGENCY LIGHTING THROUGH INVERTER (100VA) EQUAL TO DUAL LITE LG-1-S+RTSLG (REMOTE TEST SW).

ALL FIXTURE VOLTAGES ARE 120 VOLT UNLESS INDICATED OTHERWISE.

OCCUPANCY SENSOR SCHEDULE

SYMBOL	MOUNTING	VOLTAGE	RATED CURRENT	SENSOR TYPE	SENSOR COVERAGE	MFGR. & MODEL	REMARKS
⊖ A	SURFACE/ CLG	120 VAC	800 Watt	DT	360° 24'x24'	SENSOR SWITCH CMR-PDT-9	SURFACE CLG DT – LINE VOLTAGE
⊖ B	SURFACE/ CLG	120 VAC	800 Watt	DT	360° 56'x56'	SENSOR SWITCH CMR-PDT-10	SURFACE CLG DT – LINE VOLTAGE EXTENDED RANGE
$OS	WALL SWITCH	120 VAC	800 Watt	DT	160° 20'	SENSOR SWITCH WSD-PDT	WALL SWITCH

ABBREVIATIONS:
PIR=PASSIVE INFRARED
U=ULTRASONIC
DT=DUAL TECHNOLOGY (PIR+U)

REMARKS:

FLOOR BOX SCHEDULE

TAG	TYPE	SERVICE CAPACITY RECEPTACLES	DATA OUTLETS	VOICE OUTLETS	MFGR. & MODEL	REMARKS
FB1	SURFACE RECEPTACLE	2	1	0	LEGRAND 880W2 (BOX) 827TCAL-BZ (COVER PLATE)	(1)(2) TWO GANG BOX

REMARKS:
(1) ALUMINUM POWDER-COAT COVER PLATE.
(2) ARCHITECT TO SELECT COVER PLATE FINAL FINISHES FROM STANDARD FINISH COLORS AVAILABLE.

ELECTRICAL SYMBOL SCHEDULE

MOUNTING HGT.	SYMBOL	DESCRIPTION
		EQUIPMENT AND WIRING
		DIRECT EQUIPMENT CONNECTION
		MOTOR CONNECTION-SEE EQUIP. SCHEDULE FOR TYPE, WIRING, ETC.
	J	JUNCTION BOX-CONCEALED IN FINISHED AREAS, SURFACE IN UNFINISHED AREAS
		COMBINATION STARTER/ DISCONNECT
		SAFETY DISCONNECT SWITCH WITH COVER INTERLOCK-W.P. INDICATES WATERPROOF (NON-FUSED UNLESS INDICATED BY 'F'-FUSED)
		MANUAL STARTER
		STARTER
		ELECTRICAL POWER PANEL
		DOUBLE TUB ELECTRICAL POWER PANEL
		RECEPTACLES
18"		DUPLEX: RECESSED – W.P. INDICATES WATERPROOF
18"		DUPLEX: SURFACE
18"		TWO DUPLEX RECEPTS. IN TWO GANG BOX
18"		TWO DUPLEX RECEPTS. SURFACE MTD IN TWO GANG BOX
18"	GFI	DUPLEX: W/GROUND FAULT INTERRUPTION PROTECTION
		FLUSH FLOOR BOX WITH DUPLEX RECPTACLE
		CEILING MOUNTED DUPLEX RECPTACLE
	FB#	FLUSH FLOOR BOX W/ RECEPTACLES & LV OUTLETS
		TYPE AS SCHEDULED
		DUPLEX RECEPT. MOUNTED ABOVE CASEWORK BACKSPLASH
		DUPLEX RECEPT. MOUNTED IN CABINET FACE
18"		250V, 2P, 3W SINGLE RECEPT. – AMPS AS SHOWN ON DWGS
		SINGLE RECEPTACLE
		TELEPHONE AND COMMUNICATION SYSTEMS
18"		DATA OUTLET
18"		TELEPHONE OUTLET
18"		VOICE/DATA OUTLET
		VOICE/DATA OUTLET MTD ABOVE CASEWORK BACKSPLASH
		DATA OUTLET FLUSH FLOOR MOUNTED
	WAP	DATA OUTLET SURFACE MOUNTED

NOTE:
ALL MOUNTING HEIGHTS ARE TO CENTER LINE OF DEVICE. REFER TO PLANS FOR OTHER REQ'D MTG. HEIGHTS.

MOUNTING HGT.	SYMBOL	DESCRIPTION
		LIGHTING FIXTURES
	PANEL/CIRC.# TYPE SWITCHING	LED: SURFACE/ PENDANT
		LED: RECESSED
		LED: SURFACE WALL MOUNTED
		HID: SURFACE/PENDANT
		HID: RECESSED
		HID: SURFACE WALL MOUNTED
		COMPACT FLUORESCENT: SURFACE/PENDANT
		COMPACT FLUORESCENT: RECESSED
		COMPACT FLUORESCENT: SURFACE/WALL MTD
		LED: RECESSED
		LED: SURFACE, CEILING MOUNTED
		LED: SURFACE, WALL MOUNTED
		EXIT LIGHT: ARROWS, FACES & MOUNTING AS SHOWN ON DRAWINGS
		TRACK LIGHTING
		SWITCHES
48"	$	SINGLE POLE
48"	$3	THREE WAY
48"	$4	FOUR WAY
48"	$Ø	SWITCH AND DUPLEX RECEPTACLE IN TWO GANG BOX
	$F	FUSED TOGGLE SWITCH
48"	$SC	SPEED CONTROLLER SWITCH SUPPLIED BY H.C. INSTALLED BY E.C.
48"	$D	DIMMING SWITCH
48"	$P	SWITCH WITH PILOT LIGHT
48"	$OS	OCCUPANCY SENSOR CONTROLLED WALL SWITCH
48"	T	ELECTRONIC TIMER SWITCH
	#	OCCUPANCY SENSOR CEILING MTD. TYPE AS SCHEDULED

ABBREVIATIONS
SUBSCRIPTS
AFF=ABOVE FINISH FLOOR
GFI=GROUND FAULT INTERRUPTER
NL=NIGHT LIGHT-24 HOURS
PC=PHOTOCELL CONTROLLED
PC/TC=PHOTOCELL TIME CLOCK CONTROLLED
TC=TIME CLOCK CONTROLLED
WP=WEATHERPROOF

EQUIPMENT
CU = CONDENSING UNIT
EH = ELECTRIC HEAT
EWC = ELECT. WATER COOLER
F = FURNACE
ERV = ENERGY RECOVERY UNIT
EWH = ELECTRIC WATER HEATER
RCP = DWH RECIRCULATING PUMP

NOTE:
REFER TO ARCHITECTURAL DRAWINGS FOR ADA MOUNTING HEIGHT REQUIREMENTS DIFFERENT THAN LISTED ON THIS SHEET & COMPLY WITH ARCHITECTURAL DRAWINGS FOR FINAL LOCATIONS & MOUNTING HEIGHTS.

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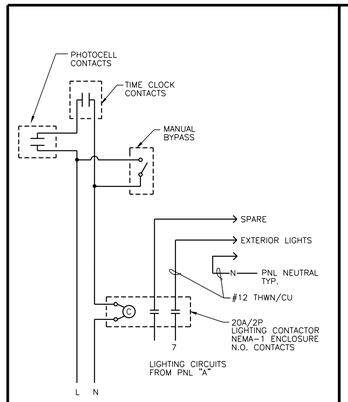
REVISIONS:

PROJECT # 14099

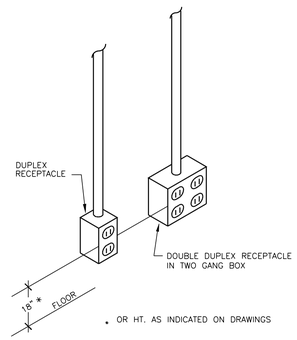
ELECTRICAL SCHEDULES

E2.0



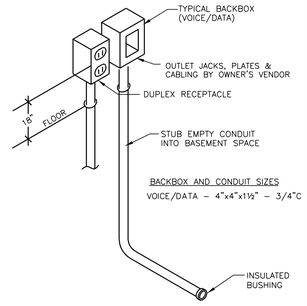
4 EXTERIOR LIGHTING CONTACTOR SCHEMATIC
N.T.S.

E-22D



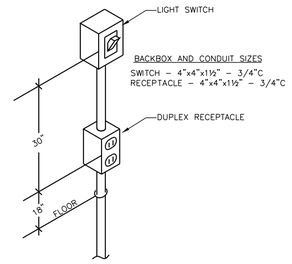
3 BACKBOX INSTALLATION DETAIL
RECEPTACLE
N.T.S.

E-3C



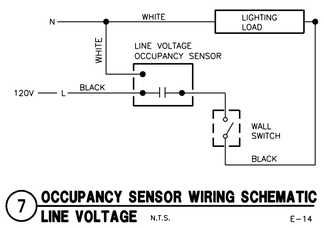
2 BACKBOX INSTALLATION DETAIL
N.T.S.

E-4C



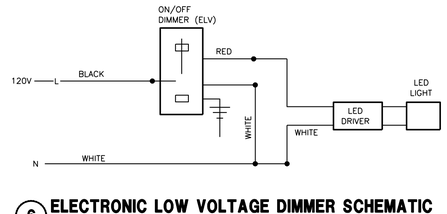
1 STACKED BACKBOX INSTALLATION DETAIL
SWITCH/RECEPTACLE
N.T.S.

E-3L



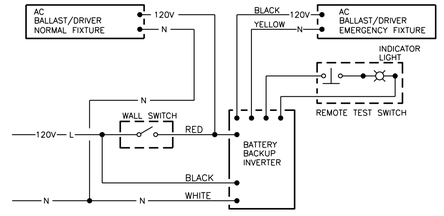
7 OCCUPANCY SENSOR WIRING SCHEMATIC
LINE VOLTAGE N.T.S.

E-14



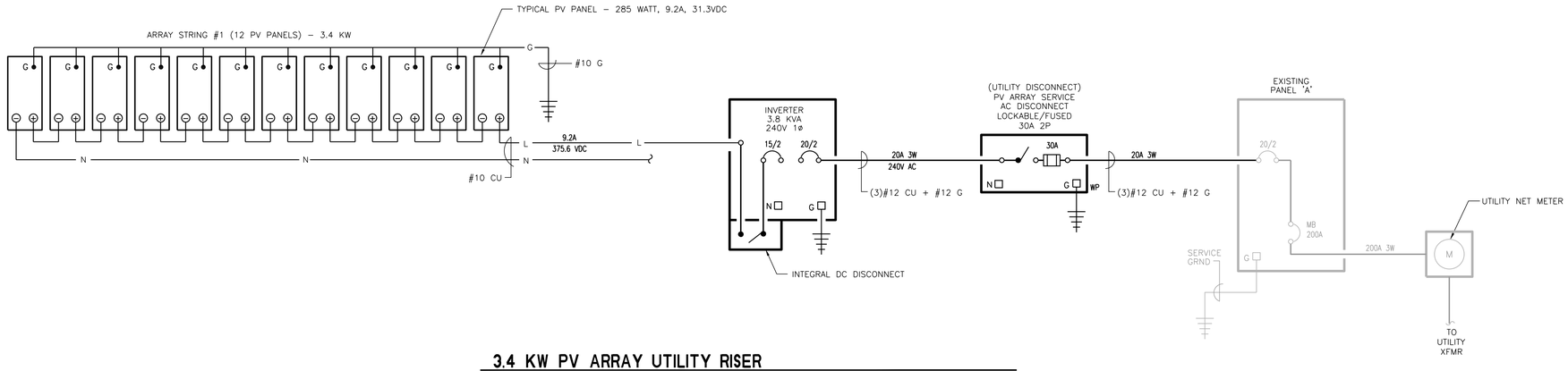
6 ELECTRONIC LOW VOLTAGE DIMMER SCHEMATIC
N.T.S.

E-15C



5 BATTERY BACKUP / INVERTER WIRING SCHEMATIC
NTS

E-15B



3.4 KW PV ARRAY UTILITY RISER

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ELECTRICAL DETAILS

E3.0