

# HIGHWAY WORK PROPOSAL

Wisconsin Department of Transportation  
DT1502 10/2010 s.66.29(7) Wis. Stats.

Proposal Number:

11

COUNTY	STATE PROJECT ID	FEDERAL PROJECT ID	PROJECT DESCRIPTION	HIGHWAY
Columbia	5640-02-81		Lodi-Merrimac South Ferry Landing Wayside	STH 113

This proposal, submitted by the undersigned bidder to the Wisconsin Department of Transportation, is in accordance with the advertised request for proposals. The bidder is to furnish and deliver all materials, and to perform all work for the improvement of the designated project in the time specified, in accordance with the appended Proposal Requirements and Conditions.

Proposal Guaranty Required, \$ 40,000.00 Payable to: Wisconsin Department of Transportation	Attach Proposal Guaranty on back of this PAGE.
Bid Submittal Due Date: May 12, 2015 Time (Local Time): 9:00 AM	Firm Name, Address, City, State, Zip Code
Contract Completion Time November 13, 2015	<b>SAMPLE</b> <b>NOT FOR BIDDING PURPOSES</b>
Assigned Disadvantaged Business Enterprise Goal 0 %	This contract is exempt from federal oversight.

This certifies that the undersigned bidder, duly sworn, is an authorized representative of the firm named above; that the bidder has examined and carefully prepared the bid from the plans, Highway Work Proposal, and all addenda, and has checked the same in detail before submitting this proposal or bid; and that the bidder or agents, officer, or employees have not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this proposal bid.

**Do not sign, notarize, or submit this Highway Work Proposal when submitting an electronic bid on the Internet.**

Subscribed and sworn to before me this date \_\_\_\_\_

\_\_\_\_\_  
(Signature, Notary Public, State of Wisconsin)

\_\_\_\_\_  
(Print or Type Name, Notary Public, State Wisconsin)

\_\_\_\_\_  
(Date Commission Expires)

Notary Seal

\_\_\_\_\_  
(Bidder Signature)

\_\_\_\_\_  
(Print or Type Bidder Name)

\_\_\_\_\_  
(Bidder Title)

## For Department Use Only

Type of Work Building construction, concrete and asphalt pavement removal, base aggregate dense, concrete sidewalk, asphaltic surface, permanent signing, traffic control, sod, building demolition, septic system installation, well system installation, and erosion control.	
Notice of Award Dated	Date Guaranty Returned

**PLEASE ATTACH  
PROPOSAL GUARANTY HERE**

**Effective with November 2007 Letting**

**PROPOSAL REQUIREMENTS AND CONDITIONS**

The bidder, signing and submitting this proposal, agrees and declares as a condition thereof, to be bound by the following conditions and requirements.

If the bidder has a corporate relationship with the proposal design engineering company, the bidder declares that it did not obtain any facts, data, or other information related to this proposal from the design engineering company that was not available to all bidders.

The bidder declares that they have carefully examined the site of, and the proposal, plans, specifications and contract forms for the work contemplated, and it is assumed that the bidder has investigated and is satisfied as to the conditions to be encountered, as to the character, quality, and quantities of work to be performed and materials to be furnished, and as to the requirements of the specifications, special provisions and contract. It is mutually agreed that submission of a proposal shall be considered conclusive evidence that the bidder has made such examination.

The bidder submits herewith a proposal guaranty in proper form and amount payable to the party as designated in the advertisement inviting proposals, to be retained by and become the property of the owner of the work in the event the undersigned shall fail to execute the contract and contract bond and return the same to the office of the engineer within fourteen (14) days after having been notified in writing to do so; otherwise to be returned.

The bidder declares that they understand that the estimate of quantities in the attached schedule is approximate only and that the attached quantities may be greater or less in accordance with the specifications.

The bidder agrees to perform the said work, for and in consideration of the payment of the amount becoming due on account of work performed, according to the unit prices bid in the following schedule, and to accept such amounts in full payment of said work.

The bidder declares that all of the said work will be performed at their own proper cost and expense, that they will furnish all necessary materials, labor, tools, machinery, apparatus, and other means of construction in the manner provided in the applicable specifications and the approved plans for the work together with all standard and special designs that may be designed on such plans, and the special provisions in the contract of which this proposal will become a part, if and when accepted. The bidder further agrees that the applicable specifications and all plans and working drawings are made a part hereof, as fully and completely as if attached hereto.

The bidder, if awarded the contract, agrees to begin the work not later than ten (10) days after the date of written notification from the engineer to do so, unless otherwise stipulated in the special provisions.

The bidder declares that if they are awarded the contract, they will execute the contract agreement and begin and complete the work within the time named herein, and they will file a good and sufficient surety bond for the amount of the contract for performance and also for the full amount of the contract for payment.

The bidder, if awarded the contract, shall pay all claims as required by Section 779.14, Statutes of Wisconsin, and shall be subject to and discharge all liabilities for injuries pursuant to Chapter 102 of the Statutes of Wisconsin, and all acts amendatory thereto. They shall further be responsible for any damages to property or injury to persons occurring through their own negligence or that of their employees or agents, incident to the performance of work under this contract, pursuant to the Standard Specifications for Road and Bridge Construction applicable to this contract.

In connection with the performance of work under this contract, the contractor agrees to comply with all applicable state and federal statutes relating to non-discrimination in employment. No otherwise qualified person shall be excluded from employment or otherwise be subject to discrimination in employment in any manner on the basis of age, race, religion, color, gender, national origin or ancestry, disability, arrest or conviction record (in keeping with s.111.32), sexual orientation, marital status, membership in the military reserve, honesty testing, genetic testing, and outside use of lawful products. This provision shall include, but not be limited to the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation, and selection for training, including apprenticeship. The contractor further agrees to ensure equal opportunity in employment to all applicants and employees and to take affirmative action to attain a representative workforce.

The contractor agrees to post notices and posters setting forth the provisions of the nondiscrimination clause, in a conspicuous and easily accessible place, available for employees and applicants for employment.

If a state public official (section 19.42, Stats.) or an organization in which a state public official holds at least a 10% interest is a party to this agreement, this contract is voidable by the state unless appropriate disclosure is made to the State of Wisconsin Ethics Board.

## BID PREPARATION

### **Preparing the Proposal Schedule of Items**

#### **A General**

- (1) Obtain bidding proposals as specified in **section 102** of the standard specifications prior to 11:45 AM of the last business day preceding the letting. Submit bidding proposals using one of the following methods:
  1. Electronic bid on the internet.
  2. Electronic bid on a printout with accompanying diskette or CD ROM.
  3. Paper bid under a waiver of the electronic submittal requirements.
- (2) Bids submitted on a printout with accompanying diskette or CD ROM or paper bids submitted under a waiver of the electronic submittal requirements govern over bids submitted on the internet.
- (3) The department will provide bidding information through the department's web site at <http://www.dot.wisconsin.gov/business/engrserv/bid-letting-information.htm>. The contractor is responsible for reviewing this web site for general notices as well as information regarding proposals in each letting. The department will also post special notices of all addenda to each proposal through this web site no later than 4:00 P.M. local time on the Thursday before the letting. Check the department's web site after 5:00 P.M. local time on the Thursday before the letting to ensure all addenda have been accounted for before preparing the bid. When bidding using methods 1 and 2 above, check the Bid Express™ on-line bidding exchange at <http://www.bidx.com/> after 5:00 P.M. local time on the Thursday before the letting to ensure that the latest schedule of items Expedite file (\*.ebs or \*.00x) is used to submit the final bid.
- (4) Interested parties can subscribe to the Bid Express™ on-line bidding exchange by following the instructions provided at the [www.bidx.com](http://www.bidx.com) web site or by contacting:

Info Tech Inc.  
5700 SW 34th Street, Suite 1235  
Gainesville, FL 32608-5371  
email: <mailto:customer.support@bidx.com>

- (5) The department will address equipment and process failures, if the bidder can demonstrate that those failures were beyond their control.
- (6) Contractors are responsible for checking on the issuance of addenda and for obtaining the addenda. Notice of issuance of addenda is posted on the department's web site at <http://www.dot.wisconsin.gov/business/engrserv/bid-letting-information.htm> or by calling the department at (608) 266-1631. Addenda can ONLY be obtained from the departments web site listed above or by picking up the addenda at the Bureau of Highway Construction, Room 601, 4802 Sheboygan Avenue, Madison, WI, during regular business hours.

#### **B Submitting Electronic Bids**

##### **B.1 On the Internet**

- (1) Do the following before submitting the bid:
  1. Have a properly executed annual bid bond on file with the department.
  2. Have a digital ID on file with and enabled by Info Tech Inc. Using this digital ID will constitute the bidder's signature for proper execution of the bidding proposal.
- (2) In lieu of preparing, delivering, and submitting the proposal as specified in **102.6** and **102.9** of the standard specifications, submit the proposal on the internet as follows:

1. Download the latest schedule of items reflecting all addenda from the Bid Express™ web site.
  2. Use Expedite™ software to enter a unit price for every item in the schedule of items.
  3. Submit the bid according to the requirements of Expedite™ software and the Bid Express™ web site. Do not submit a bid on a printout with accompanying diskette or CD ROM or a paper bid. If the bidder does submit a bid on a printout with accompanying diskette or a paper bid in addition to the internet submittal, the department will disregard the internet bid.
  4. Submit the bid before the hour and date the Notice to Contractors designates.
  5. Do not sign, notarize, and return the bidding proposal described in 102.2 of the standard specifications.
- (3) The department will not consider the bid accepted until the hour and date the Notice to Contractors designates.

## **B.2 On a Printout with Accompanying Diskette or CD ROM**

- (1) Download the latest schedule of items from the Wisconsin pages of the Bid Express™ web site reflecting the latest addenda posted on the department's web site at <http://www.dot.wisconsin.gov/business/engrserv/bid-letting-information.htm>. Use Expedite™ software to prepare and print the schedule of items. Provide a valid amount for all price fields. Follow instructions and review the help screens provided on the Bid Express™ web site to assure that the schedule of items is prepared properly.
- (2) Staple an 8 1/2 by 11 inch printout of the Expedite™ generated schedule of items to the other proposal documents submitted to the department as a part of the bidder's sealed bid. As a separate submittal not in the sealed bid envelop but due at the same time and place as the sealed bid, also provide the Expedite™ generated schedule of items on a 3 1/2 inch computer diskette or CD ROM. Label each diskette or CD ROM with the bidder's name, the 4 character department-assigned bidder identification code from the top of the bidding proposal, and a list of the proposal numbers included on that diskette or CD ROM as indicated in the following example:

**Bidder Name**

**BN00**

**Proposals: 1, 12, 14, & 22**

- (3) If bidding on more than one proposal in the letting, the bidder may include all proposals for that letting on one diskette or CD ROM. Include only submitted proposals with no incomplete or other files on the diskette or CD ROM.
- (4) The bidder-submitted printout of the Expedite™ generated schedule of items is the governing contract document and must conform to the requirements of section 102 of the standard specifications. If a printout needs to be altered, cross out the printed information with ink or typewriter and enter the new information and initial it in ink. If there is a discrepancy between the printout and the diskette or CD ROM, the department will analyze the bid using the printout information.
- (5) In addition to the reasons specified in section 102 of the standard specifications, proposals are irregular and the department may reject them for one or more of the following:
  1. The check code printed on the bottom of the printout of the Expedite™ generated schedule of items is not the same on each page.
  2. The check code printed on the printout of the Expedite™ generated schedule of items is not the same as the check code for that proposal provided on the diskette or CD ROM.

3. The diskette or CD ROM is not submitted at the time and place the department designates.

### **C Waiver of Electronic Submittal**

- (1) The bidder may request a waiver of the electronic submittal requirements. Submit a written request for a waiver in lieu of bids submitted on the internet or on a printout with accompanying diskette or CD ROM. Use the waiver that was included with the paper bid document sent to the bidder or type up a waiver on the bidder's letterhead. The department will waive the electronic submittal requirements for a bidding entity (individual, partnership, joint venture, corporation, or limited liability company) for up to 4 individual proposals in a calendar year. The department may allow additional waivers for equipment malfunctions.
- (2) Submit a schedule of items on paper conforming to [section 102](#) of the standard specifications. The department charges the bidder a \$75 administrative fee per proposal, payable at the time and place the department designates for receiving bids, to cover the costs of data entry. The department will accept a check or money order payable to: "Wisconsin, Dept. of Transportation."
- (3) In addition to the reasons specified in [section 102](#) of the standard specifications, proposals are irregular and the department may reject them for one or more of the following:
  1. The bidder fails to provide the written request for waiver of the electronic submittal requirements.
  2. The bidder fails to pay the \$75 administrative fee before the time the department designates for the opening of bids unless the bidder requests on the waiver that they be billed for the \$75.
  3. The bidder exceeds 4 waivers of electronic submittal requirements within a calendar year.
- (4) In addition to the reasons specified in [section 102](#) of the standard specifications, the department may refuse to issue bidding proposals for future contracts to a bidding entity that owes the department administrative fees for a waiver of electronic submittal requirements.





# PROPOSAL BID BOND

DT1303 1/2006

Wisconsin Department of Transportation

Proposal Number	Project Number	Letting Date
Name of Principal		
Name of Surety	State in Which Surety is Organized	

We, the above-named Principal and the above-named Surety, are held and firmly bound unto the State of Wisconsin in the sum equal to the Proposal Guaranty for the total bid submitted for the payment to be made; we jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns. The condition of this obligation is that the Principal has submitted a bid proposal to the State of Wisconsin acting through the Department of Transportation for the improvement designated by the Proposal Number and Letting Date indicated above.

If the Principal is awarded the contract and, within the time and manner required by law after the prescribed forms are presented for signature, enters into a written contract in accordance with the bid, and files the bond with the Department of Transportation to guarantee faithful performance and payment for labor and materials, as required by law, or if the Department of Transportation shall reject all bids for the work described, then this obligation shall be null and void; otherwise, it shall be and remain in full force and effect. In the event of failure of the Principal to enter into the contract or give the specified bond, the Principal shall pay to the Department of Transportation **within 10 business days of demand** a total equal to the Proposal Guaranty as liquidated damages; the liability of the Surety continues for the full amount of the obligation as stated until the obligation is paid in full.

The Surety, for value received, agrees that the obligations of it and its bond shall not be impaired or affected by any extension of time within which the Department of Transportation may accept the bid; and the Surety does waive notice of any such extension.

IN WITNESS, the Principal and Surety have agreed and have signed by their proper officers and have caused their corporate seals to be affixed this date: **(DATE MUST BE ENTERED)**

## PRINCIPAL

\_\_\_\_\_  
(Company Name) **(Affix Corporate Seal)**

\_\_\_\_\_  
(Signature and Title)

\_\_\_\_\_  
(Company Name)

\_\_\_\_\_  
(Signature and Title)

\_\_\_\_\_  
(Company Name)

\_\_\_\_\_  
(Signature and Title)

\_\_\_\_\_  
(Company Name)

\_\_\_\_\_  
(Signature and Title)

## NOTARY FOR PRINCIPAL

\_\_\_\_\_  
(Date)

State of Wisconsin )  
 ) ss.  
\_\_\_\_\_ County )

On the above date, this instrument was acknowledged before me by the named person(s).

\_\_\_\_\_  
(Signature, Notary Public, State of Wisconsin)

\_\_\_\_\_  
(Print or Type Name, Notary Public, State of Wisconsin)

\_\_\_\_\_  
(Date Commission Expires)

**Notary Seal**

\_\_\_\_\_  
(Name of Surety) **(Affix Seal)**

\_\_\_\_\_  
(Signature of Attorney-in-Fact)

## NOTARY FOR SURETY

\_\_\_\_\_  
(Date)

State of Wisconsin )  
 ) ss.  
\_\_\_\_\_ County )

On the above date, this instrument was acknowledged before me by the named person(s).

\_\_\_\_\_  
(Signature, Notary Public, State of Wisconsin)

\_\_\_\_\_  
(Print or Type Name, Notary Public, State of Wisconsin)

\_\_\_\_\_  
(Date Commission Expires)

**Notary Seal**

**IMPORTANT: A certified copy of Power of Attorney of the signatory agent must be attached to the bid bond.**



# CERTIFICATE OF ANNUAL BID BOND

DT1305 8/2003

Wisconsin Department of Transportation

Time Period Valid (From/To)	
Name of Surety	
Name of Contractor	
Certificate Holder	Wisconsin Department of Transportation

This is to certify that an annual bid bond issued by the above-named Surety is currently on file with the Wisconsin Department of Transportation.

This certificate is issued as a matter of information and conveys no rights upon the certificate holder and does not amend, extend or alter the coverage of the annual bid bond.

**Cancellation:** Should the above policy be cancelled before the expiration date, the issuing surety will give thirty (30) days written notice to the certificate holder indicated above.

\_\_\_\_\_  
(Signature of Authorized Contractor Representative)

\_\_\_\_\_  
(Date)



## March 2010

## LIST OF SUBCONTRACTORS

Section 66.0901(7), Wisconsin Statutes, provides that as a part of the proposal, the bidder also shall submit a list of the subcontractors the bidder proposes to contract with and the class of work to be performed by each. In order to qualify for inclusion in the bidder's list a subcontractor shall first submit a bid in writing, to the general contractor at least 48 hours prior to the time of the bid closing. The list may not be added to or altered without the written consent of the municipality. A proposal of a bidder is not invalid if any subcontractor and the class of work to be performed by the subcontractor has been omitted from a proposal; the omission shall be considered inadvertent or the bidder will perform the work personally.

No subcontract, whether listed herein or later proposed, may be entered into without the written consent of the Engineer as provided in Subsection 108.1 of the Standard Specifications.

[illegible]

**DECEMBER 2000**

**CERTIFICATION REGARDING DEBARMENT, SUSPENSION, AND OTHER  
RESPONSIBILITY MATTERS - PRIMARY COVERED TRANSACTIONS**

Instructions for Certification

1. By signing and submitting this proposal, the prospective contractor is providing the certification set out below.
2. The inability of a person to provide the certification required below will not necessarily result in denial of participation in this covered transaction. The prospective contractor shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective contractor to furnish a certification or an explanation shall disqualify such person from participation in this transaction.
3. The certification in this clause is a material representation of fact upon which reliance was placed when the department determined to enter into this transaction. If it is later determined that the contractor knowingly rendered an erroneous certification in addition to other remedies available to the Federal Government the department may terminate this transaction for cause or default.
4. The prospective contractor shall provide immediate written notice to the department to whom this proposal is submitted if at any time the prospective contractor learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
5. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. You may contact the department to which this proposal is being submitted for assistance in obtaining a copy of those regulations.
6. The prospective contractor agrees by submitting this proposal that, should this contract be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department entering into this transaction.
7. The prospective contractor further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," which is included as an addendum to PR-1273 - "Required Contract Provisions Federal Aid Construction Contracts," without

modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

8. The contractor may rely upon a certification of a prospective subcontractor/materials supplier that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A contractor may decide the method and frequency by which it determines the eligibility of its principals. Each contractor may, but is not required to, check the Disapproval List (telephone # 608/266/1631).
9. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a contractor is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
10. Except for transactions authorized under paragraph 6 of these instructions, if a contractor in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department may terminate this transaction for cause or default.

Certification Regarding Debarment, Suspension, and Other Responsibility Matters - Primary Covered Transactions

- (1) The prospective contractor certifies to the best of its knowledge and belief, that it and its principals:
  - (a) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
  - (b) Have not within a three-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements or receiving stolen property;
  - (c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offense enumerated in paragraph (1)(b) of this certification; and
  - (d) Have not within a three-year period preceding this proposal had one or more public transactions (Federal, State or local) terminated for cause or default.
- (2) Where the prospective contractor is unable to certify to any of the statements in this certification, such prospective contractor shall attach an explanation to this proposal.

## Special Provisions

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## **SPECIAL PROVISIONS**

### **1. General.**

Perform the work under this construction contract for Project 5640-02-81, Lodi – Merrimac, South Ferry Landing Wayside, STH 113, Columbia County, Wisconsin as the plans show and execute the work as specified in the State of Wisconsin, Department of Transportation, Standard Specifications for Highway and Structure Construction, 2015 Edition, as published by the department, and these special provisions.

If all or a portion of the plans and special provisions are developed in the SI metric system and the schedule of prices is developed in the US standard measure system, the department will pay for the work as bid in the US standard system.

100-005 (20141107)

### **2. Scope of Work.**

The work under this contract shall consist of grading, base aggregate, septic system, well and system, asphaltic surface pavement, concrete sidewalk, permanent signing, restroom building and all incidental items necessary to complete the work as shown on the plans and included in the proposal and contract.

### **3. Prequalification of Bidders.**

*Replace standard spec 102.1 with the following:*

Prequalification of bidders is not required.

### **4. Prosecution and Progress.**

Begin work within ten calendar days after the engineer issues a written notice to do so, but not prior to July 6, 2015.

Provide the start date to the engineer in writing within a month after executing the contract but at least 14 calendar days before the preconstruction conference. Upon approval, the engineer will issue the notice to proceed within 10 calendar days before the approved start date.

To revise the start date, submit a written request to the engineer at least two weeks before the intended start date. The engineer will approve or deny that request based on the conditions cited in the request and its effect on the department's scheduled resources.

The wayside shall remain open at all times. Maintain ingress and egress access to the wayside for wayside users, emergency vehicles, and personnel. Maintain access to ferry at all times.

The existing restroom building and associated sidewalk to the facility shall remain intact until the new restroom building is fully operational. The connecting sidewalk from the existing restroom to ferry queuing lanes may be removed in order to start construction of the new restroom facility. The sidewalk from the existing restroom heading southeast from the building to the wayside shall remain in place and be used as the access route to the wayside and the ferry queuing lanes as indicated on the plans.

Place select crushed material or base aggregate dense on the same day as excavation. At the end of each day, place base aggregate dense to provide a ramp to the entrances.

The contractor is advised to mobilize construction equipment that is a size suitable for maneuvering in the limited area throughout the project. The contractor is responsible for any damage done to objects inside the project limits.

Minimize the amount of dust created from construction. During construction operations, if aggregate, slurry from saw cutting, or other construction materials are in the travel way, the contractor shall immediately clean up the area.

The contractor may not work on weeknights from 9:00 PM to 7:00 AM and on weekends.

A qualified archaeologist to excavate human burial sites shall oversee and monitor all project-related ground disturbing activities within the boundaries of Burial Site 47CO231/BCO-0166 (the entire project site). The department will contract directly with the qualified archaeologist for this project. Keep the engineer and department informed of when ground disturbing activities will take place, to ensure the archaeologist is present during those periods. Note that if human bone is discovered during construction, the department will cease work activities immediately to take action with the Wisconsin Historical Society. Give a minimum two week notice to allow time to arrange for archaeologist.

## **5. Traffic and Traffic Control.**

Place roadway/wayside and sidewalk signing and control as detailed on the plans, specials, and in conformance with the Manual on Uniform Traffic Control Devices (MUTCD), latest edition. Remove conflicting signs and control as necessary to avoid confusion.

Do not close STH 113 and associated ferry queueing lanes until work is set and ready to be executed. Only one lane is allowed to be closed within the queueing lanes to allow for the minor work to be completed by the sidewalk and maintenance ramp. Contractor shall coordinate with the engineer on when the lane will be closed. The queueing lane shall not be closed on a Friday, Saturday, and Sunday. This closure shall be short term.

The west side of the wayside shall be closed off to public vehicle access to allow for construction operations and staging as indicated on the plans. Access within this area shall be granted at all times to both Columbia County personnel and the department for ferry operations and maintenance of the existing restroom facility throughout the construction process. Access to the existing garage shall be maintained at all times for the above listed users.

Storage of materials and equipment within the wayside shall be located within the designated staging area. No materials and/or equipment shall block or prevent public access into the wayside. Do not store equipment, materials, or vehicles on STH 113, STH 188, and vehicle queueing lanes near the project limits. In addition, vehicles of contractor's employees, subcontractors, subcontractors' employees, vendors, etc. shall park within the wayside parking lot as marked or off to the one side of the travel lanes to allow two-way traffic on each side of the wayside at all times. Flaggers are required when the delivery is made to ensure vehicles within the wayside are able to maneuver in/out of the area.

Temporary fencing shall be used to fence off the work site of the new restroom building and staging area. Safety fencing shall be used to fence off areas to divide wayside users and the construction site to maintain access to the existing restroom building. Safety fencing shall be orange snow fencing or an engineer approved equal fencing. Safety fencing is incidental to the bid item Traffic Control (Project). Existing sidewalk to be removed as indicated on the plans shall remain in place as long as possible during the construction of this project to provide an access route to the existing restroom building.

Use drums, barricades, flexible tubular markers, and/or safety fence to direct pedestrian traffic around the work zone. Protect and delineate hazards such as open excavations, abrupt drop-offs, and exposed manholes/vaults with wedged material, drums, barricades, and safety fence as described in the special provisions or as directed by the engineer. Type III barricades shall be used to close off the west side of the wayside as indicated on the plans.

Contractor shall designate an individual within the company that can be available at all times including nights, weekends, and holidays to be responsible for the maintenance of the local traffic access, emergency traffic, and traffic control repair. Provide the name and telephone number of this person to the engineer and Columbia County Highway Department.

All traffic control related items, labor, materials, and equipment associated with traffic control items shall be paid for under the Traffic Control bid item.

## 6. **Holiday Work Restrictions.**

During the holiday dates/times listed below no work shall be performed at the site. The site shall be completely closed off to public access and cleaned up for wayside users to use the park and restrooms. An accessible route to the existing restrooms shall be laid out within the wayside and to/from the ferry queuing lanes.

- From noon Friday, September 4, 2015 to 7:00 AM Tuesday, September 8, 2015 for Labor Day.

## 7. **Utilities.**

This contract does come under the provision of Administrative Rule Trans 220.

Underground utility facilities are located within the project limits. Utility adjustments are required for this construction project as noted below. Coordinate construction activities with a call to Diggers Hotline or a direct call to the utilities that have facilities in the area as required per state statutes. Use caution to ensure the integrity of underground facilities and maintain code clearances from overhead facilities at all times.

Utility companies will be abandoning some facilities in place after relocating facilities to avoid conflicts with the proposed work. Removal by the contractor of any abandoned facilities necessary to complete the proposed work, including plugging the remaining ends of the facility, is considered incidental to the contract.

Contact each utility company listed in the plans, prior to preparing bids, to obtain current information on the status of existing and any new utility relocation work.

### **POWER:**

#### **Electric: Alliant Energy**

Attn: Jason Hogan  
4902 N. Biltmore Ln, Suite 1000  
Madison, WI 53718  
Phone: (608) 458-4871 or (608) 395-7395  
Email: [jasonhogan@alliantenergy.com](mailto:jasonhogan@alliantenergy.com)

Electric power to the new restroom will be supplied by the existing garage at the wayside site. All materials and labor to make this connection to the existing electrical panel at the garage to the new restroom building shall be completed by the contractor. Contractor shall coordinate work with Alliant prior to installation.

There is a single electrical service that runs along the back side of the sidewalk along the ferry queuing lanes. No work to this line is anticipated.

## **LIGHTING:**

### **Wisconsin Department of Transportation**

Attn: Dale Roth  
3601 Pierstorff St.  
Madison, WI 53704  
Phone: (608) 245-5355  
Email: [dale.roth@dot.wi.gov](mailto:dale.roth@dot.wi.gov)

There is a single phase electrical line running from an existing light pole along the ferry queuing lanes to the light pole located behind the existing restroom facility. The contractor shall abandon the existing electrical line and place a new line as indicated on the plans to run along the north side of the proposed restroom facility. The new line shall use the existing connection to the overall system at the light near the ferry queuing lanes.

## **COMMUNICATIONS:**

### **Charter Communications**

Attn: Tom Payne  
2701 Daniels St.  
Madison, WI 53718  
Phone: (608) 274-3822, Ext. 6652  
Email: [tom.payne@charter.com](mailto:tom.payne@charter.com)

A cable line is located between the ferry queuing lanes to towards the existing garage onsite. Contractor shall contact Charter prior to the installation of the septic tanks to ensure the line is located and can bend around the proposed tank.

## **GAS:**

### **MG&E**

Attn: Shaun Endres  
PO BOX 1231  
Madison, WI 53701-1231  
Phone: (608) 252-7224  
Email: [sendres@mge.com](mailto:sendres@mge.com)

MG&E will be relocating their existing gas main through the way side to prevent conflicts of the restroom building with the main. Contractor shall coordinate with MG&E on when they plan to perform their relocation to ensure it does not impact the project schedule and does not create another conflict with the proposed septic system force main. Contractor shall assist in coordination of the gas service with MG&E and the department to make the main connection to the service at the new restroom facility.

**TELEPHONE:**

**Frontier Engineering**

Attn: Jerry Moore

2222 W. Wisconsin St.

Portage, WI 53901

Phone: (608) 742-9507

Email: [jerold.r.moore@ftr.com](mailto:jerold.r.moore@ftr.com)

A telephone line crosses the proposed force main line to the septic system, east of the existing garage. No vertical conflict is anticipated.

**8. Erosion Control.**

*Supplement standard spec 107.20 with the following:*

Provide the Erosion Control Implementation Plan (ECIP) a minimum of 14 days prior to the pre-construction conference. Pursue operations in a timely and diligent manner, continuing all construction operations methodically from the initial removals and topsoil stripping operations through the subsequent grading, paving, and re-topsoiling to minimize the period of exposure to possible erosion.

Topsoil graded areas, as designated by the engineer, immediately after grading has been completed within those areas. Sod and/or turf restoration shall be installed/completed on all topsoiled areas within 5 working days after placement of topsoil.

**9. Dewatering.**

Prepare a dewatering plan as part of the Erosion Control Implementation Plan (ECIP) and provide to the engineer for review and approval prior to starting dewatering operations. The plan shall include a description of the proposed dewatering methods and maps or drawings indicating the location of the dewatering facilities and points of discharge of the water.

Use the Wisconsin Department of Natural Resources Technical Standard on Dewatering (standard number 1061) as found on their website at <http://www.dnr.wi.gov/runoff/stormwater/techstds.htm> for the appropriate best management practice and proper application and sizing of such practice. As part of the Erosion Control Implementation Plan (ECIP) submittal, supply all pertinent information and calculations used to determine the best management practice for dewatering at each location it is required. Prior to construction, obtain approval from the engineer for the proposed method of treatment including supporting calculations.

Any polymers or other materials included in the dewatering plan for sediment coagulation shall be incidental to the dewatering and on the Wisconsin Department of Natural Resource's approved list.



Dewatering will be incidental to the contract. Work under this item shall included in all work, materials, equipment, permitting and incidentals required to dewater the site during construction or to work with the water on-site in a manner that allows the project to be constructed in accordance to the plans and specifications. This provision includes the dewatering of groundwater, surface water runoff, and trench water. The contractor shall be responsible for all work, materials and equipment required to comply with permit conditions to dewater the site. Contractor shall see the applicable specification on dewatering with these Special Provisions.

## **10. Public Convenience and Safety.**

*Revise standard spec 107.8(6) as follows:*

Check for and comply with local ordinances governing the hours of operation of construction equipment. Do not operate motorized construction equipment between 7:00 PM and 7:00 AM, Monday through Friday, and between 7:00 PM and 7:00 AM from Friday through Sunday, unless prior written approval is obtained from the engineer and department.

Operate motorized equipment in compliance with applicable regulations relating to noise levels permissible adjacent to the construction site. All motorized construction equipment shall be required to meet manufacturer's specifications or have equipment noise reducing systems. Maintain mufflers and exhaust systems in good operating condition, free from leaks and holes.

## **11. Removing Buildings, Restroom Facility, Item 204.0235.01.**

*Amend standard spec 204 to include the following:*

Remove existing restroom building upon completion of the new restroom building. The building was determined to have asbestos. The caulk found with asbestos shall be properly abated per State Standards and Regulations prior to the demolition of the building. No lead paint causing special treatment was found within the building. All costs to abate the asbestos shall be included in the Remove Building bid item.

## **12. Excavation Common, Item 205.0100.**

*Amend standard spec 205.0100 to include the following:*

Note the above listed existing utilities located within the wayside site when performing common excavation. Existing utilities are shown on the plans and possible conflicts are described under the utility section of these special provisions. Their facilities will be close in proximity to the grading limits of the excavation for the force main and septic tank. No extra payment will be made for working around these facilities. Care is recommended to avoid damaging other facilities. The contractor will be responsible for any damage.

Excavation common only accounts for the excavation of the site such as the sidewalk, pavement, and overall site grading. All other excavation costs for such items as the force main, septic system, well, restroom footings, etc. shall be included in those bid items.

It is anticipated that this project will not require the contractor to bring in or remove material to balance the site. Balance the material across the site.

Existing site soil boring conditions can be found in the plans. For additional information, the soils report can be obtained by contact Robert Spoerl with WisDOT Highway Roadside Facilities at (608) 266-8665 or [Robert.spoerl@dot.wi.gov](mailto:Robert.spoerl@dot.wi.gov).

**13. Base Aggregate Dense, ¾ - Inch, Item 305.0110.**

Use this base aggregate material under the concrete sidewalk areas only if the natural granular sand on the site is unsuitable to be used as base material. The engineer will determine the material to be used under the sidewalk areas.

**14. Base Aggregate Dense, 1 ¼ Inch, Item 305.0120.**

Use this base aggregate material under the Asphaltic Surface Pavement area.

**15. QMP Base Aggregate.**

**A Description**

**A.1 General**

- (1) This special provision describes contractor quality control (QC) sampling and testing for base aggregates, documenting those test results, and documenting related production and placement process changes. This special provision also describes department quality verification (QV), independent assurance (IA), and dispute resolution.
- (2) Conform to standard spec 301, standard spec 305, and standard spec 310 as modified here in this special provision. Apply this special provision to material placed under all of the Base Aggregate Dense and Base Aggregate Open Graded bid items, except do not apply this special provision to material classified as reclaimed asphaltic pavement placed under the Base Aggregate Dense bid items.
- (3) Do not apply this special provision to material placed under the Aggregate Detours, Salvaged Asphaltic Pavement Base, Breaker Run, Select Crushed, Pit Run, Subbase, or Riprap bid items.
- (4) Provide and maintain a quality control program, defined as all activities related to and documentation of the following:
  1. Production and placement control and inspection.
  2. Material sampling and testing.

- (5) Chapter 8 of the department's construction and materials manual (CMM) provides additional detailed guidance for QMP work and describes required sampling and testing procedures. The contractor may obtain the CMM from the department's web site at:

<http://roadwaystandards.dot.wi.gov/standards/cmm/index.htm>

## **A.2 Contractor Testing for Small Quantities**

- (1) The department defines a small quantity, for each individual Base Aggregate bid item, as a plan quantity of 9000 tons or less of material as shown in the schedule of items under that bid item.
- (2) The requirements under this special provision apply equally to a small quantity for an individual bid item except as follows:

1. The contractor need not submit a full quality control plan but shall provide an organizational chart to the engineer including names, telephone numbers, and current certifications of all persons involved in the quality control program for material under affected bid items.

2. Divide the aggregate into uniformly sized sublots for testing as follows:

<b>Plan Quantity</b>	<b>Minimum Required Testing</b>
$\leq 1500$ tons	One test from production, load-out, or placement at the contractor's option <sup>[1]</sup>
$> 1500$ tons and $\leq 6000$ tons	Two tests of the same type, either from production, load-out, or placement at the contractor's option <sup>[1]</sup>
$> 6000$ tons and $\leq 9000$ tons	Three placement tests <sup>[2] [3]</sup>

- <sup>[1]</sup> If using production tests for acceptance, submit test results to the engineer for review prior to incorporating the material into the work. Production test results are valid for a period of 3 years.

- <sup>[2]</sup> For 3-inch material, obtain samples at load-out.

- <sup>[3]</sup> If the actual quantity overruns 9000 tons, create overrun sublots to test at a rate of one additional placement test for each 3000 tons, or fraction of 3000 tons, of overrun.

3. No control charts are required. Submit aggregate load-out and placement test results to the engineer within one business day of obtaining the sample. Assure that all properties are within the limits specified for each test.
  4. Department verification testing is optional for quantities of 6000 tons or less.
- (3) Material represented by a subplot with any property outside the specification limits is nonconforming. The department may reject material or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

## **B Materials**

### **B.1 Quality Control Plan**

- (1) Submit a comprehensive written quality control plan to the engineer at or before the pre-construction meeting. Do not place base before the engineer reviews and comments on the plan. Construct the project as that plan provides.

- (2) Do not change the quality control plan without the engineer's review. Update the plan with changes as they become effective. Provide a current copy of the plan to the engineer and post in each of the contractor's laboratories as changes are adopted. Ensure that the plan provides the following elements:
1. An organizational chart with names, telephone numbers, current certifications and/or titles, and roles and responsibilities of QC personnel.
  2. The process used to disseminate QC information and corrective action efforts to the appropriate persons. Include a list of recipients, the communication means that will be used, and action time frames.
  3. A list of source and processing locations, section and quarter descriptions, for all aggregate materials requiring QC testing.
  4. Test results for wear, sodium sulfate soundness, freeze/thaw soundness, and plasticity index of all aggregates requiring QC testing. Obtain this information from the region materials unit or from the engineer.
  5. Descriptions of stockpiling and hauling methods.
  6. Locations of the QC laboratory, retained sample storage, and where control charts and other documentation is posted.
  7. An outline for resolving a process control problem. Include responsible personnel, required documentation, and appropriate communication steps.

## B.2 Personnel

- (1) Have personnel certified under the department's highway technician certification program (HTCP) perform sampling, testing, and documentation as follows:

Required Certification Level:	Sampling or Testing Roles:
Aggregate Technician IPP Aggregate Sampling Technician Aggregate Assistant Certified Technician (ACT-AGG)	Aggregate Sampling <sup>[1]</sup>
Aggregate Technician IPP Aggregate Assistant Certified Technician (ACT-AGG)	Aggregate Gradation Testing, Aggregate Fractured Particle Testing, Aggregate Liquid Limit and Plasticity Index Testing

<sup>[1]</sup> Plant personnel under the direct observation of an aggregate technician certified at level one or higher may operate equipment to obtain samples.

- (2) A certified technician must coordinate and take responsibility for the work an ACT performs. Have a certified technician ensure that all sampling and testing is performed correctly, analyze test results, and post resulting data. No more than one ACT can work under a single certified technician.

## B.3 Laboratory

- (1) Perform QC testing at a department-qualified laboratory. Obtain information on the Wisconsin laboratory qualification program from:

Materials Management Section  
3502 Kinsman Blvd.  
Madison, WI 53704  
Telephone: (608) 246-5388  
<http://www.dot.state.wi.us/business/engrserv/lab-qualification.htm>

## **B.4 Quality Control Documentation**

### **B.4.1 General**

- (1) Submit base aggregate placement documentation to the engineer within 10 business days after completing base placement. Ensure that the submittal is complete, neatly organized, and includes applicable project records and control charts.

### **B.4.2 Records**

- (1) Document all placement observations, inspection records, and control adjustments daily in a permanent field record. Also include all test results in the project records. Provide test results to the engineer within 6 hours after obtaining a sample. For 3-inch base, extend this 6-hour limit to 24 hours. Post or distribute tabulated results using a method mutually agreeable to the engineer and contractor.

### **B.4.3 Control Charts**

- (1) Plot gradation and fracture on the appropriate control chart as soon as test results are available. Format control charts according to CMM 8.30. Include the project number on base placement control charts. Maintain separate control charts for each base aggregate size, source or classification, and type.
- (2) Provide control charts to the engineer within 6 hours after obtaining a sample. For 3-inch base, extend this 6-hour limit to 24 hours. Post or distribute charts using a method mutually agreeable to the engineer and contractor. Update control charts daily to include the following:
  1. Contractor individual QC tests.
  2. Department QV tests.
  3. Department IA tests.
  4. Four-point running average of the QC tests.
- (3) Except as specified under B.8.2.1 for nonconforming QV tests, include only QC tests in the running average. The contractor may plot process control or informational tests on control charts, but do not include these tests, conforming QV tests, or IA tests in the running average.

## **B.5 Contractor Testing**

- (1) Test gradation, fracture, liquid limit and plasticity index during placement for each base aggregate size, source or classification, and type.
- (2) Test gradation once per 3000 tons of material placed. Determine random sample locations and provide those sample locations to the engineer. Obtain samples after the material has been bladed, mixed, and shaped but before compacting; except collect

3-inch samples from the stockpile at load-out. Do not sample from material used to maintain local traffic or from areas of temporary base that will not have an overlying pavement. On days when placing only material used to maintain local traffic or only temporary base that will not have an overlying pavement, no placement testing is required.

- (3) Split each contractor QC sample and identify it according to CMM 8.30. Retain the split for 7 calendar days in a dry, protected location. If requested for department comparison testing, deliver the split to the engineer within one business day.
- (4) The engineer may require additional sampling and testing to evaluate suspect material or the technician's sampling and testing procedures.
- (5) Test fracture for each gradation test until the fracture running average is above the lower warning limit. Subsequently, the contractor may reduce the frequency to one test per 10 gradation tests if the fracture running average remains above the warning limit.
- (6) Test the liquid limit and plasticity index for the first gradation test. Subsequently, test the liquid limit and plasticity index a minimum of once per 10 gradation tests.

## **B.6 Test Methods**

### **B.6.1 Gradation**

- (1) Test gradation using a washed analysis conforming to the following as modified in CMM 8.60:  
Gradation..... AASHTO T 27  
Material finer than the No. 200 sieve..... AASHTO T 11
- (2) For 3-inch base, if 3 consecutive running average points for the percent passing the No. 200 sieve are 8.5 percent or less, the contractor may use an unwashed analysis. Wash at least one sample out of 10. If a single running average for the percent passing the No. 200 sieve exceeds 8.5 percent, resume washed analyses until 3 consecutive running average points are again 8.5 percent passing or less.
- (3) Maintain a separate control chart for each sieve size specified in standard spec 305 or standard spec 310 for each base aggregate size, source or classification, and type. Set control and warning limits based on the standard specification gradation limits as follows:
  1. Control limits are at the upper and lower specification limits.
  2. There are no upper warning limits for sieves allowing 100 percent passing and no lower control limits for sieves allowing 0 percent passing.
  3. Dense graded warning limits, except for the No. 200 sieve, are 2 percent within the upper and lower control limits. Warning limits for the No. 200 sieve are set 0.5 percent within the upper and lower control limits.
  4. Open graded warning limits for the 1-inch, 3/8-inch, and No. 4 sieves are 2 percent within the upper and lower control limits. Upper warning limits for the No. 10, No. 40, and No. 200 sieves are 1 percent inside the upper control limit.

### **B.6.2 Fracture**

- (1) Test fracture conforming to CMM 8.60. The engineer will waive fractured particle testing on quarried stone.
- (2) Maintain a separate fracture control chart for each base aggregate size, source or classification, and type. Set the lower control limit at the contract specification limit, either specified in another special provision or in table 301-2 of standard spec 301.2.4.5. Set the lower warning limit 2 percent above the lower control limit. There are no upper limits.

### **B.6.3 Liquid Limit and Plasticity**

- (1) Test the liquid limit and plasticity according to AASHTO T 89 and T 90.
- (2) Ensure the material conforms to the limits specified in standard spec table 301-2.

## **B.7 Corrective Action**

### **B.7.1 General**

- (1) Consider corrective action when the running average trends toward a warning limit. Take corrective action if an individual test exceeds the contract specification limit. Document all corrective actions both in the project records and on the appropriate control chart.

### **B.7.2 Placement Corrective Action**

- (1) Do not blend additional material on the roadbed to correct gradation problems.
- (2) Notify the engineer whenever the running average exceeds a warning limit. When 2 consecutive running averages exceed a warning limit, the engineer and contractor will discuss appropriate corrective action. Perform the engineer's recommended corrective action and increase the testing frequency as follows:
  1. For gradation, increase the QC testing frequency to at least one randomly sampled test per 1000 tons placed.
  2. For fracture, increase the QC testing frequency to at least one test per gradation test.
- (3) If corrective action improves the property in question such that the running average after 4 additional tests is within the warning limits, the contractor may return to the testing frequency specified in B.5.3. If corrective action does not improve the property in question such that the running average after 4 additional individual tests is still in the warning band, repeat the steps outlined above starting with engineer notification.
- (4) If the running average exceeds a control limit, material starting from the first running average exceeding the control limit and ending at the first subsequent running average inside the control limit is nonconforming and subject to pay reduction.

- (5) For individual test results significantly outside the control limits, notify the engineer, stop placing base, and suspend other activities that may affect the area in question. The engineer and contractor will jointly review data, data reduction, and data analysis; evaluate sampling and testing procedures; and perform additional testing as required to determine the extent of potentially unacceptable material. The engineer may direct the contractor to remove and replace that material. Individual test results are significantly outside the control limits if meeting one or more of the following criteria:
  1. A gradation control limit for the No. 200 sieve is exceeded by more than 3.0 percent.
  2. A gradation control limit for any sieve, except the No. 200, is exceeded by more than 5.0 percent.
  3. The fracture control limit is exceeded by more than 10.0 percent.

## **B.8 Department Testing**

### **B.8.1 General**

- (1) The department will conduct verification testing to validate the quality of the product and independent assurance testing to evaluate the sampling and testing. The department will provide the contractor with a listing of names and telephone numbers of all QV and IA personnel for the project, and provide test results to the contractor within 2 business days after the department obtains the sample.

## **B.8.2 Verification Testing**

### **B.8.2.1 General**

- (1) The department will have an HTCP technician, or ACT working under a certified technician, perform QV sampling and testing. Department verification testing personnel must meet the same certification level requirements specified in B.2 for contractor testing personnel for each test result being verified. The department will notify the contractor before sampling so the contractor can observe QV sampling.
- (2) The department will conduct QV tests of each base aggregate size, source or classification, and type during placement conforming to the following:
  1. One non-random test on the first day of placement.
  2. At least one random test per 30,000 tons, or fraction of 30,000 tons, placed.
- (3) The department will sample randomly, at locations independent of the contractor's QC work, collecting one sample at each QV location. The department will collect QV samples after the material has been bladed, mixed, and shaped but before compacting; except, for 3-inch aggregates, the department will collect samples from the stockpile at load-out. The department will split each sample, test half for QV, and retain half.
- (4) The department will conduct QV tests in a separate laboratory and with separate equipment from the contractor's QC tests. The department will use the same methods specified for QC testing.



- (5) The department will assess QV results by comparing to the appropriate specification limits. If QV test results conform to the specification, the department will take no further action. If QV test results are nonconforming, add the QV to the QC test results as if it were an additional QC test.

### **B.8.3 Independent Assurance**

- (1) Independence assurance is unbiased testing the department performs to evaluate the department's QV and the contractor's QC sampling and testing including personnel qualifications, procedures, and equipment. The department will perform an IA review according to the department's independent assurance program. That review may include one or more of the following:
  1. Split sample testing.
  2. Proficiency sample testing.
  3. Witnessing sampling and testing.
  4. Test equipment calibration checks.
  5. Reviewing required worksheets and control charts.
  6. Requesting that testing personnel perform additional sampling and testing.
- (2) If the department identifies a deficiency, and after further investigation confirms it, correct that deficiency. If the contractor does not correct or fails to cooperate in resolving identified deficiencies, the engineer may suspend placement until action is taken. Resolve disputes as specified in B.9.

### **B.9 Dispute Resolution**

- (1) The engineer and contractor should make every effort to avoid conflict. If a dispute between some aspect of the contractor's and the engineer's testing program does occur, seek a solution mutually agreeable to the project personnel. The department and contractor may review the data, examine data reduction and analysis methods, evaluate sampling and testing procedures, and perform additional testing. Use ASTM E 178 to evaluate potential statistically outlying data.
- (2) Production test results, and results from other process control testing, may be considered when resolving a dispute.
- (3) If the project personnel cannot resolve a dispute, and the dispute affects payment or could result in incorporating non-conforming product, the department will use third party testing to resolve the dispute. The department's central office laboratory, or a mutually agreed on independent testing laboratory, will provide this testing. The engineer and contractor will abide by the results of the third party tests. The party in error will pay service charges incurred for testing by an independent laboratory. The department may use third party test results to evaluate the quality of questionable materials and determine the appropriate payment. The department may reject material or otherwise determine the final disposition of nonconforming material as specified in standard spec 106.5.

### **C (Vacant)**

## **D (Vacant)**

## **E Payment**

- (1) Costs for all sampling, testing, and documentation required under this special provision are incidental to this work. If the contractor fails to perform the work required under this special provision, the department may reduce the contractor's pay. The department will administer pay reduction under the non-performance of QMP administrative item.
- (2) For material represented by a running average exceeding a control limit, the department will reduce pay by 10 percent of the contract price for the affected Base Aggregate bid items listed in subsection A. The department will administer pay reduction under the Nonconforming QMP Base Aggregate Gradation or Nonconforming QMP Base Aggregate Fracture Administrative items. The department will determine the quantity of nonconforming material as specified in B.7.2.

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## **16. Drill Hole in Earth 10-Inch, Item 639.0110.**

*Amend standard spec 639 Drilling Wells as follows:*

- i. Eliminate the requirement for "pump" under standard spec 639.2.4.
- ii. Eliminate the requirement for Pump and Well Platform under standard spec 639.3.12 and standard spec 639.4.5.
- iii. Eliminate the requirement for Wayside Shelter under standard spec 639.3.13 and standard spec 639.4.6

## **17. Existing Trees.**

Protect all existing trees on the site from damage from the construction efforts and equipment. If the construction efforts damage and/or disturb any trees and they are deemed as so or will not survive, the contractor is responsible for full replacement and installation of a similar tree on the site with a minimum 2" diameter trunk, at no additional cost to the project.

## **18. Temporary Fence, Item SPV.0090.01.**

### **A Description**

Install temporary construction chain link fencing around the new restroom building site to protect construction efforts during construction.

### **B Materials**

Place 6 foot tall galvanized steel or coated chain link fence with accessible locking gates shall be placed around the construction site for the restroom building and material staging area as indicated on the plans. Other types of chain link fencing may be used if approved

by the engineer prior to installation. Fencing shall be made moveable within sections to allow for material deliveries within the fenced area and access to the work areas during the work day. Drive all corners or gate posts into the ground by 12-18 inches deep to ensure the overall fencing remains intact and in place during construction.

#### **C Construction**

Enclose the new restroom building construction area and construction staging area with temporary chain link fence to protect the project site from public access, vandalism, injury, theft, etc. Install gates within the fencing that are lockable. Minimize gaps between fencing sections as much as possible and be no wider than 3-inches. Brace fencing if needed, but ensure no access is allowed through the use of the bracing. Fencing shall be plumb and level to prevent unwanted access to the site. Review all fencing at the end of each work day to ensure it is properly enclosing the work area and is secure during non-work hours.

#### **D Measurement**

The department will measure Temporary Fence by the linear foot of fence, acceptably completed.

#### **Payment**

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.01	Temporary Fence	LF
Payment is full compensation for furnishing all materials, erecting posts and fence and for removing and disposing of fencing.		

### **19. Remove Curb Head, Item SPV.0090.02.**

#### **A Description**

Remove the curb head along a section of existing curb and gutter to construct a maintenance ramp as shown on the plans.

#### **B Materials**

Remove the existing curb head as indicated on the plans to allow for a maintenance ramp to be installed. Contractor shall use a carriage mounted, large diameter precision concrete saw to remove the curb head.

#### **C Construction**

Remove the existing curb head at the bottom of the maintenance ramp for a minimum of 5-feet and run the head back to a full head with tapers each direction at a 12:1 slope to tie the existing sidewalk into the new ramp as indicated in the plan detail. Cuts to the curb shall be clean, straight, and neatly completed.

#### **D Measurement**

The department will measure Remove Curb Head by the linear foot of head removed, acceptably completed.

**E Payment**

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.02	Remove Curb Head	LF

Payment is full compensation for sawing, removal and disposal of concrete curb head.

**20. General Requirements for Building Construction.**

The following general requirements are applicable to Items: Restroom Building, General Construction, Restroom Building Plumbing, Restroom Building (HVAC) Ventilation, Rope Fence, Temporary Fence, and Restroom Building Electrical.

Work related to general requirements will not be paid separately, but shall be included in the applicable contract unit prices.

**INDEX OF GENERAL REQUIREMENT SPECIFICATIONS****DIVISION 1 – GENERAL REQUIREMENTS**

01300 Administrative Requirements

01330 Submittal Procedures

01400 Quality Requirements

01500 Temporary Facilities and Controls

01600 Product Requirements

01700 Execution Requirements

## DIVISION 1 - GENERAL REQUIREMENTS

### SECTION 01300

#### ADMINISTRATIVE REQUIREMENTS

##### PART 1 GENERAL

###### 1.01 SECTION INCLUDES

- A. Coordination.
- B. Field engineering.
- C. Preinstallation meetings.
- D. Disposal of Materials.
- E. Contractor Environmental Requirements.
- F. Examination.
- G. Preparation.

###### 1.02 COORDINATION

- A. Coordinate scheduling, submittals, and Work of the various sections of the Project Manual to assure efficient and orderly sequence of installation of interdependent construction elements.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate Work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, operating equipment.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical work indicated diagrammatically on Drawings. Follow routing shown for pipes, ducts, and conduit, as closely as practicable; place runs parallel with line of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- E. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion.

- F. After owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance to contract documents, to minimize disruption of owner's activities.

#### 1.03 FIELD ENGINEERING

- A. Provide field-engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.

#### 1.04 PREINSTALLATION MEETING

- A. When required in individual specification sections, convene a preinstallation meeting at work site prior to commencing Work of the section.
- B. Require attendance of parties directly affecting, or affected by, work of the specific section.
- C. Notify architect/engineer four days in advance of meeting date.
- D. Prepare agenda and preside at meeting:
  - 1. Review conditions of installation, preparation and installation procedures.
  - 2. Review coordination with related work.

#### 1.05 DISPOSAL OF MATERIALS

- A. Remove debris from building and site as it accumulates. Debris shall be transported on rubber-tired trucks and covered to prevent spread of dust.
- B. All materials and property which are indicated to be removed shall be legally disposed of in an approved landfill, by the contractor.

#### 1.06 CONTRACTOR ENVIRONMENTAL REQUIREMENTS

- A. Contractors shall remove all of their waste chemicals, chemically contaminated materials, and empty containers used in the performance of their work from the site daily. All materials and containers must be disposed of off site in accordance to local, state and federal requirements. Do not dispose of chemicals into site drain systems (inside or outside of building), onto soil or into trash dumpsters operated by the owner. Containers owned by contractor shall not be marked with the owner's name.
- B. Liquids are to be discharged to drain only upon authorization from the owner. All solid wastes shall be removed from the site to approved facilities or placed in appropriate containers/holding areas as authorized by the owner.
- C. All vehicles, machinery and equipment stored on site must be in approved areas and maintained as necessary to assure proper operation and containment of fluids.

- D. Pumps, hoses, temporary storage tanks, and tankers shall be appropriately staffed and located to prevent the release of liquids from the equipment to the environment. Appropriate actions must be taken to mitigate impacts in the event of a release.
- E. All releases of chemicals, fuel oils, wastewater, or other materials shall be immediately reported to the owner.
- F. Tankers, being used to transport or store materials on site must be clean of any contaminants from prior usage of the tanker.
- G. All containers of chemicals, petroleum products, or other materials shall be stored, used, and disposed of in a manner preventing their release to the environment in any amount. Handling methods deemed inappropriate by owner shall be immediately corrected by the contractor.

## PART 2 PRODUCTS

Not Used

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Beginning new work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural attachment of new Work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Verify that utility services are available, of the correct characteristics, and in the correct location.

### 3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply any manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION

## SECTION 01330

### SUBMITTAL PROCEDURES

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Submittal procedures.
- B. Shop Drawings.
- C. Product Data.
- D. Samples.
- E. Manufacturer's installation instructions.
- F. Manufacturers' certificates.

##### 1.02 RELATED SECTIONS

- A. Section 01400 - Quality Control: Manufacturers' field services and reports.
- B. Section 01700 - Contract Closeout: Contract warranties and closeout submittals.

##### 1.03 SUBMITTAL PROCEDURES

- A. Identify project, contractor, subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate.
- 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 to the requirements of the work and contract documents.
- C. Schedule submittals to expedite the project and deliver to architect/engineer at business address. Coordinate submission of related items.
- D. Identify variations from contract documents and product or system limitations which may be detrimental to successful performance of the completed work.
- E. Provide space for contractor and architect/engineer review stamps.
- F. When revised for resubmission, identify changes made since previous submission.
- G. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.



- H. Submittals not requested will not be recognized or processed.

#### 1.04 SHOP DRAWINGS

- A. Shop Drawings: Submit to architect/engineer for review for limited purpose of checking for conformance with information given and design concept expressed in contract documents. Produce copies and distribute in accordance to SUBMITTAL PROCEDURES article and for record documents purposes described in Section 01700.
- B. Submit PDFs via email.
- C. Shop Drawings: Submit for review. After review, produce copies and distribute in accordance to the SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700 - Contract Closeout.
- D. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

#### 1.05 PRODUCT DATA

- A. Product Data: Submit to architect/engineer for review for limited purpose of checking for conformance with information given and design concept expressed in contract documents. Provide copies and distribute in accordance to SUBMITTAL PROCEDURES article and for record documents purposes described in Section 01700.
- B. Submit PDFs via email.
- C. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this project.
- D. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- E. After review, distribute in accordance to the Submittal Procedures article above and provide copies for record documents described in Section 01700 - Execution Requirements.

#### 1.06 SAMPLES

- A. Samples: Submit to architect/engineer for review for limited purpose of checking for conformance with information given and design concept expressed in contract documents. Produce duplicates and distribute in accordance to SUBMITTAL

PROCEDURES article and for record documents purposes described in Section 01700.

- B. Samples for Selection as Specified in Product Sections:
  - 1. Submit to architect/engineer for aesthetic, color, or finish selection.
  - 2. Submit samples of finishes (from full range of manufacturers= standard colors,) (in custom colors selected,) textures, and patterns for architect/engineer selection.
  - 3. After review, produce duplicates and distribute in accordance to SUBMITTAL PROCEDURES article and for record documents purposes described in Section 01700.
- C. Submit samples to illustrate functional and aesthetic characteristics of the Product with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
- D. Include identification on each sample with full Project information.
- E. Submit the number of samples specified in individual specification sections; one of which will be retained by architect/engineer.
- F. Reviewed samples which may be used in the work are indicated in individual specification sections.
- G. Samples will not be used for testing purposes unless specifically stated in specification section.

#### 1.07 MANUFACTURER INSTALLATION INSTRUCTIONS

- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing to architect/engineer in quantities specified for product data.
- B. Indicate special procedures, perimeter conditions requiring special attention and special environmental criteria required for application or installation.

#### 1.08 MANUFACTURER CERTIFICATES

- A. When specified in individual specification sections, submit certification by manufacturer, installation/application subcontractor, or contractor to architect/engineer, in quantities specified for product data.
- B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or product, but must be acceptable to architect/engineer.

PART 2 PRODUCTS  
Not Used

PART 3 EXECUTION  
Not Used

END OF SECTION

## SECTION 01400

### QUALITY REQUIREMENTS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Quality control and control of installation.
- B. Workmanship.
- C. Manufacturer's Instructions.
- D. Tolerances.
- E. References.
- F. Mockup requirements.
- G. Manufacturers' field services and reports.
- H. Examination.
- I. Preparation.

##### 1.02 QUALITY CONTROL AND CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. When manufacturers' instructions conflict with contract documents, request clarification from architect/engineer before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

##### 1.03 WORKMANSHIP

- A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

- B. Perform work by persons qualified to produce workmanship of specified quality.
- C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

#### 1.04 MANUFACTURER'S INSTRUCTIONS

- A. Comply with instructions in full detail, including each step in sequence. Should instructions conflict with contract documents, request clarification from architect/engineer before proceeding.

#### 1.05 TOLERANCES

- A. Monitor fabrication and installation tolerance control of products to produce acceptable work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. When manufacturers' tolerances conflict with contract documents, request clarification from architect/engineer before proceeding.
- C. Adjust Products to appropriate dimensions; position before securing products in place.

#### 1.06 REFERENCES

- A. For Products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date of contract documents, except where a specific date is established by code.
- C. Obtain copies of standards where required by product specification sections.
- D. When specified reference standards conflict with contract documents, request clarification from architect/engineer before proceeding.
- E. Neither contractual relationship, duties, nor responsibilities of the parties in Contract nor those of the architect/engineer shall be altered from the contract documents by mention or inference otherwise in any reference document.

#### 1.07 MOCK-UP REQUIREMENTS

- A. Tests will be performed under provisions identified in this section and identified in the respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.

- C. Accepted mock-ups are representative of the quality required for the work.
- D. Where mock-up has been accepted by architect/engineer and is specified in product specification sections to be removed; remove mock-up and clear area when directed to do so.

#### 1.08 INSPECTING AND TESTING LABORATORY SERVICES

- A. Employ and pay for services of an independent testing agency or laboratory acceptable to owner to perform specified testing.
  - 1. Prior to start of Work, submit testing laboratory name, address, and telephone number, and names of full time [registered engineer] [specialist] and responsible officer.
  - 2. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of deficiencies reported by inspection.
- B. The independent firm will perform inspections, tests, and other services specified in individual specification sections and as required by the architect/engineer or the owner.
- C. Inspecting, testing, and source quality control may occur on or off the project site. Perform off-site inspecting or testing as required by the architect/engineer or the owner.
- D. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
  - 1. Notify architect/engineer and independent firm 24 hours prior to expected time for operations requiring services.
  - 2. Make arrangements with independent firm and pay for additional samples and tests required for contractor's use.
- E. Testing and employment of testing agency or laboratory shall not relieve contractor of obligation to perform work in accordance to requirements of contract documents.
- F. Re-testing or re-inspection required because of non-conformance to specified requirements shall be performed by same independent firm on instructions by architect/engineer. Payment for re-testing or re-inspection will be charged to contractor by deducting testing charges from Contract Sum/Price.
- G. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the architect/engineer. Payment for retesting will be charged to the contractor by deducting inspecting or testing charges from the Contract Sum/Price.

- H. Agency Responsibilities:
  - 1. Test samples of mixes submitted by contractor.
  - 2. Provide qualified personnel at site. Cooperate with architect/engineer and contractor in performance of services.
  - 3. Perform specified sampling and testing of products in accordance to specified standards.
  - 4. Ascertain compliance of materials and mixes with requirements of contract documents.
  - 5. Promptly notify architect/engineer and contractor of observed irregularities or non-conformance of Work or products.
  - 6. Perform additional tests required by architect/engineer.
  - 7. Attend preconstruction meetings and progress meetings.
- I. Agency Reports: After each test, promptly submit one copy of report to architect/engineer, owner and to contractor. When requested by architect/engineer, provide interpretation of test results. Include the following:
  - 1. Date issued.
  - 2. Project title and number.
  - 3. Name of inspector.
  - 4. Date and time of sampling or inspection.
  - 5. Identification of product and specifications section.
  - 6. Location in Project.
  - 7. Type of inspection or test.
  - 8. Date of test.
  - 9. Results of tests.
  - 10. Conformance with contract documents.
- J. Limits On Testing Authority:
  - 1. Agency or laboratory may not release, revoke, alter, or enlarge on requirements of contract documents.
  - 2. Agency or laboratory may not approve or accept any portion of the work.
  - 3. Agency or laboratory may not assume duties of contractor.
  - 4. Agency or laboratory has no authority to stop the work.

#### 1.09 MANUFACTURERS' FIELD SERVICES AND REPORTS

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, and test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- C. Submit report within 30 days of observation to architect/engineer for information.

## PART 2 PRODUCTS

Not Used

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify existing site conditions and substrate surfaces are acceptable for subsequent work. Beginning new work means acceptance of existing conditions.
- B. Verify existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Verify utility services are available, of correct characteristics, and in correct locations.

### 3.02 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

END OF SECTION



## SECTION 01500

### TEMPORARY FACILITIES AND CONTROLS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Temporary Utilities:
  - 1. Temporary electricity.
  - 2. Temporary lighting for construction purposes.
  - 3. Temporary heating.
  - 4. Temporary ventilation.
  - 5. Temporary water service.
  - 6. Temporary sanitary facilities.
- B. Construction Facilities:
  - 1. Progress cleaning and waste removal.
- C. Temporary Controls:
  - 1. Enclosures and fencing.
  - 2. Protection of the work.
  - 3. Security.
  - 4. Water control.
  - 5. Dust control.
  - 6. Erosion and sediment control.
- D. Removal of utilities, facilities, and controls.

##### 1.02 TEMPORARY ELECTRICITY

- A. Provide and pay for power service required from utility source as needed for construction operation.
- B. Provide temporary electric feeder from electrical service.
- C. Complement existing power service capacity and characteristics as required for construction operations.
- D. Provide power outlets, with branch wiring and distribution boxes located as required for construction operations. Provide flexible power cords as required for portable construction tools and equipment.
- E. Permanent convenience receptacles may be utilized during construction.

##### 1.03 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

- A. Provide and maintain incandescent lighting for construction operations.

- B. Provide and maintain lighting to exterior staging and storage areas after dark for security purposes.
- C. Provide and maintain lighting to interior work areas after dark for security purposes.
- D. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps for specified lighting levels.
- E. Maintain lighting and provide routine repairs.
- F. Permanent building lighting may be utilized during construction.

#### 1.04 TEMPORARY HEATING

- A. Provide and pay for heating devices and heat as needed to maintain specified conditions for construction operations.
- B. Enclose building prior to activating temporary heat in accordance to Enclosures article in this section.
- C. Prior to operation of permanent equipment for temporary heating purposes, verify installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.
- D. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless indicated otherwise in product sections.
- E. Operation of permanent equipment for temporary heating purposes is not allowed.
- F. Combustion type temporary heating devices shall be vented outside of any temporary enclosure and building envelope. Combustion gas shall not be allowed in any temporary enclosure and building envelope.

#### 1.05 TEMPORARY VENTILATION

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

#### 1.06 TEMPORARY WATER SERVICE

- A. Provide and pay for suitable quality water service as needed to maintain specified conditions for construction operations.
- B. Extend branch piping with outlets located so water is available by hoses with threaded connections.

#### 1.07 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide facilities at time of project mobilization.
- B. Permanent facilities may not be used during construction operations. Maintain daily in clean and sanitary condition.

#### 1.08 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing spaces.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and rubbish from site periodically and dispose off-site.
- E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

#### 1.09 ENCLOSURES AND FENCING

- A. Construction: Contractor's option.
- B. Provide 4 feet high minimum fence around construction site; equip with vehicular and pedestrian gates with locks.
- C. Exterior Enclosures:
  - 1. Provide temporary insulated weather tight closure of exterior openings to accommodate acceptable working conditions and protection for products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

#### 1.10 SECURITY

- A. Security Program:
  - 1. Protect Work from theft, vandalism, and unauthorized entry.
  - 2. Initiate program at project mobilization.
  - 3. Maintain program throughout construction period.

- B. Entry Control:
  - 1. Restrict entrance of persons and vehicles into project site.
  - 2. Allow entrance only to authorized persons with proper identification.

#### 1.11 WATER CONTROL

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

#### 1.12 DUST CONTROL

- A. Execute Work by methods to minimize raising dust from construction operations.
- B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

#### 1.13 EROSION AND SEDIMENT CONTROL

- A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
- B. Minimize surface area of bare soil exposed at one time.
- C. Provide temporary measures including berms, dikes, and drains, and other devices to prevent water flow.
- D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
- E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

#### 1.14 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities, and materials, prior to Substantial Completion inspection.
- B. Remove underground installations to minimum depth of 2 feet. Grade site as indicated on drawings.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing and permanent facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

## PART 2 PRODUCTS

Not Used.

## PART 3 EXECUTION

Not Used.

END OF SECTION

## SECTION 01600

### PRODUCT REQUIREMENTS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Products.
- B. Product delivery requirements.
- C. Product storage and handling requirements.
- D. Product options.
- E. Product substitution procedures.

##### 1.02 PRODUCTS

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

##### 1.03 PRODUCT DELIVERY REQUIREMENTS

- A. Transport and handle products in accordance to manufacturer's instructions.
- B. Promptly inspect shipments to ensure products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

##### 1.04 PRODUCT STORAGE AND HANDLING REQUIREMENTS

- A. Store and protect products in accordance to manufacturers' instructions.
- B. Store with seals and labels intact and legible.
- C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.
- D. For exterior storage of fabricated products, place on sloped supports above ground.
- E. Provide [bonded] off-site storage and protection when site does not permit on-site storage or protection.
- F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

- G. Store loose granular materials on solid flat surfaces in well-drained area. Prevent mixing with foreign matter.
- H. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- I. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

#### 1.05 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: products of one of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with Provision for Substitutions: Submit request for substitution for any manufacturer not named in accordance to the following article.

#### 1.06 PRODUCT SUBSTITUTION PROCEDURES

- A. Architect/engineer will consider requests for substitutions only within 30 days after date established in Notice to Proceed.
- B. Substitutions may be considered when a product becomes unavailable through no fault of contractor.
- C. Document each request with complete data substantiating compliance of proposed Substitution with contract documents.
- D. A request constitutes a representation that contractor:
  - 1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
  - 2. Will provide same warranty for Substitution as for specified product.
  - 3. Will coordinate installation and make changes to other work which may be required for the Work to be complete with no additional cost to owner.
  - 4. Waives claims for additional costs or time extension which may subsequently become apparent.
  - 5. Will reimburse owner and architect/engineer for review or redesign services associated with re-approval by authorities having jurisdiction.
- E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to contract documents.

F. Substitution Submittal Procedure:

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

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION



## SECTION 01700

### EXECUTION REQUIREMENTS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Starting of systems.
- D. Demonstration and instructions.
- E. Testing, adjusting and balancing.
- F. Protecting installed construction.
- G. Project record documents.
- H. Operation and maintenance data.
- I. Manual for materials and finishes.
- J. Manual for equipment and systems.
- K. Spare parts and maintenance products.
- L. Product warranties and product bonds.
- M. Maintenance service.

##### 1.02 CLOSEOUT PROCEDURES

- A. Submit written certification that contract documents have been reviewed, work has been inspected, and that work is complete in accordance to contract documents and ready for architect/engineer's review.
- B. Provide submittals to owner required by authorities having jurisdiction.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

### 1.03 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces.
- C. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.
- D. Replace filters of operating equipment.
- E. Clean debris from roofs, gutters, downspouts, and drainage systems.
- F. Clean site; sweep paved areas, rake clean landscaped surfaces.
- G. Remove waste and surplus materials, rubbish, and construction facilities from site.

### 1.04 STARTING OF SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify owner seven days prior to start-up of each item.
- C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.
- E. Verify wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable contractors' personnel in accordance to manufacturers' instructions.

### 1.05 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of products to owner's personnel two weeks prior to date of substantial completion.
- B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with owner's personnel in detail to explain all aspects of operation and maintenance.

- D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at agreed time.
- E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
- F. Required instruction time for each item of equipment and system is specified in individual sections.

#### 1.06 TESTING, ADJUSTING AND BALANCING

- A. Independent firm will perform services specified in Division 15.
- B. Reports will be submitted by independent firm to architect/engineer indicating observations and results of tests and indicating compliance or non-compliance with requirements of contract documents.

#### 1.07 PROTECTING INSTALLED CONSTRUCTION

- A. Protect installed work and provide special protection where specified in individual specification sections.
- B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic from landscaped areas.

#### 1.08 PROJECT RECORD DOCUMENTS

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
  - 1. Drawings.
  - 2. Specifications.
  - 3. Addenda.
  - 4. Change Orders and other modifications to the contract.
  - 5. Reviewed shop drawings, product data, and samples.
  - 6. Manufacturer's instruction for assembly, installation, and adjusting.

- B. Ensure entries are complete and accurate, enabling future reference by owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress, not less than weekly.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
  - 1. Manufacturer's name and product model and number.
  - 2. Product substitutions or alternates utilized.
  - 3. Changes made by addenda and modifications.
- F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
  - 1. Measured depths of foundations in relation to finish first floor datum.
  - 2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - 3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
  - 4. Field changes of dimension and detail.
  - 5. Details not on original contract drawings.
- G. Submit documents to architect/engineer prior to claim for final Application for Payment.

#### 1.09 OPERATION AND MAINTENANCE DATA

- A. Submit data bound in 8-1/2 x 11 inch (A4) text pages, three D side ring binders with durable plastic covers.
- B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.
- C. Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- E. Contents: Prepare Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:
  - 1. Part 1: Directory, listing names, addresses, and telephone numbers of architect/engineer, contractor, subcontractors, and major equipment suppliers.

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

#### 1.10 MANUAL FOR MATERIALS AND FINISHES

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of work. Architect/engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by owner, submit documents within ten days after acceptance.
- C. Submit one copy of completed volumes 15 days prior to final inspection. Draft copy be reviewed and returned after final inspection, with architect/engineer comments. Revise content of document sets as required prior to final submission.
- D. Submit two sets of revised final volumes in final form within 10 days after final inspection.
- E. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Include information for re-ordering custom manufactured products.
- F. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- G. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.

- H. Additional Requirements: As specified in individual product specification sections.
- I. Include listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

#### 1.11 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of work. Architect/engineer will review draft and return one copy with comments.
- B. For equipment, or component parts of equipment put into service during construction and operated by owner, submit documents within ten days after acceptance.
- C. Submit one copy of completed volumes 15 days prior to final inspection. Draft copy be reviewed and returned after final inspection, with architect/engineer comments. Revise content of document sets as required prior to final submission.
- D. Submit two sets of revised final volumes in final form within 10 days after final inspection.
- E. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
- F. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- G. Include color coded wiring diagrams as installed.
- H. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and special operating instructions.
- I. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- J. Include servicing and lubrication schedule, and list of lubricants required.
- K. Include manufacturer's printed operation and maintenance instructions.
- L. Include sequence of operation by controls manufacturer.

- M. Include original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- N. Include control diagrams by controls manufacturer as installed.
- O. Include contractor's coordination drawings, with color coded piping diagrams as installed.
- P. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
- Q. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- R. Include test and balancing reports as specified in Section 01400.
- S. Additional Requirements: As specified in individual product specification sections.
- T. Include listing in Table of Contents for design data, with tabbed dividers and space for insertion of data.

#### 1.12 SPARE PARTS AND MAINTENANCE PRODUCTS

- A. Furnish spare parts, maintenance, and extra products in quantities specified in individual specification sections.
- B. Deliver to project site and place in location as directed by owner; obtain receipt prior to final payment.

#### 1.13 PRODUCT WARRANTIES AND PRODUCT BONDS

- A. Obtain warranties and bonds executed in duplicate by responsible subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of work.
- B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.
- C. Verify documents are in proper form, contain full information, and are notarized.
- D. Co-execute submittals when required.
- E. Include Table of Contents and assemble in three D side ring binder with durable plastic cover.
- F. Submit prior to final Application for Payment.

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

#### 1.14 MAINTENANCE SERVICE

- A. Furnish service and maintenance of components indicated in specification sections.
- B. Examine system components at frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- C. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by manufacturer of original component.
- D. Do not assign or transfer maintenance service to agent or subcontractor without prior written consent of owner.

#### PART 2 PRODUCTS

Not Used.

#### PART 3 EXECUTION

Not Used.

END OF SECTION



## **21. Restroom Facility Building, Item SPV.0105.01.**

### **Description**

This item consists of the general construction work for the restroom building. The work shall be in accordance to the applicable plans and the following specifications.

### **Materials**

See specifications below.

### **Construction**

See specifications below.

### **Measurement**

The department will measure Restroom Facility Building, as a single lump sum unit of work acceptably completed.

### **Payment**

The department will pay for measured quantities at the contract unit price, under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.01	Restroom Facility Building	LS

Payment is full compensation for furnishing all materials and equipment, and for supplying all labor, tools, equipment, and incidentals necessary to complete the work.

## **INDEX OF GENERAL CONSTRUCTION SPECIFICATIONS**

### **DIVISION 2 – SITEWORK**

02315 Excavation

02320 Backfilling and Compacting

### **DIVISION 3 - CONCRETE**

03100 Structural Cast-in-Place Concrete Forming (Building)

03200 Concrete Reinforcement (Building)

03250 Concrete Accessories (Building)

03300 Cast-in-Place Concrete (Building)

### **DIVISION 4 - MASONRY**

04100 Mortar and Masonry Grout

04300 Unit Masonry

### **DIVISION 5 - METALS**

05500 Metal Fabrications

**DIVISION 6 - WOOD AND PLASTICS**

06100 Framing and Sheathing  
06170 Plate Connected Wood Trusses  
06200 Finish Carpentry

**DIVISION 7 - THERMAL AND MOISTURE PROTECTION**

07212 Board Insulation  
07213 Loose Insulation  
07250 Weather Barriers  
07260 Vapor Retarder  
07272 Fluid-Applied Membrane Air Vapor Retarder  
07312 Granular Coated Steel Shingles  
07466 Metal Soffit, Fascia, and Siding  
07631 Gutters and Downspouts  
07900 Joint Sealers

**DIVISION 8 - DOORS AND WINDOWS**

08111 Standard Steel Doors  
08112 Standard Steel Frames  
08520 Aluminum Windows  
08710 Door Hardware  
08800 Glazing

**DIVISION 9 - FINISHES**

09670 Fluid-Applied Flooring  
09900 Painting

**DIVISION 10 - SPECIALTIES**

10170 Phenolic Toilet Compartments  
10400 Identifying Devices  
10520 Fire Extinguishers and Accessories  
10800 Toilet and Bath Accessories

**DIVISION 12 - FURNISHINGS**

12410 - Nautical Accessories

## DIVISION 2 - SITEWORK

### SECTION 02315

#### EXCAVATION

##### PART 1 GENERAL

###### 1.01 WORK INCLUDED

- A. Building excavation.

###### 1.02 RELATED WORK

- A. Section 01400 - Quality Requirements: Inspection of bearing surfaces and compaction testing.
- B. Section 02320 - Backfilling and Compacting.

###### 1.03 PROTECTION

- A. Protect bench marks from equipment and vehicular traffic.
- B. Protect above and below grade utilities which are to remain.
- C. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods required to prevent cave-in or loose soil from falling into excavation.
- D. Notify architect/engineer of unexpected subsurface conditions and discontinue affected work in area until notified to resume work.
- E. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.
- F. Grade excavation top perimeter to prevent surface water run-off into excavation.

##### PART 2 PRODUCTS

Not Used

##### PART 3 EXECUTION

###### 3.01 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Identify known underground utilities. Stake and flag locations.
- C. Identify and flag surface and aerial utilities.

- D. Notify utility company to remove and relocate utilities.
- E. Maintain and protect existing utilities remaining which pass through work area.

### 3.02 EXCAVATION

- A. Excavate subsoil required for building foundations, construction operations, and other work.
- B. Machine slope banks to angle of repose or less until shored.
- C. Excavation shall not interfere with normal 45 degree bearing splay of any foundation.
- D. Hand trim excavation and leave free of loose matter.
- E. Remove lumped subsoil, boulders, and rock up to 1/3 cu. yd., measured by volume.
- F. Correct unauthorized excavation at no cost to owner.
- G. Fill over-excavated areas under structure bearing surfaces in accordance to direction by architect/engineer.
- H. Stockpile excavated material in area designated on site and remove excess subsoil not being reused, or not re-usable from site.
- I. Excavation for building foundations shall extend to footing bearing.

### 3.03 DEWATERING

- A. Water collected in footing trenches from surface run-off or seepage of groundwater shall be removed by sump pump or other conventional dewatering method prior to placement of foundation concrete.
- B. Any soil softened by standing water shall be removed prior to resuming construction activities.
- C. Site grades shall be maintained during construction to prevent flow toward open excavations and the construction area.

### 3.04 FIELD QUALITY CONTROL

- A. Field inspection and testing shall be performed under the provisions of Section 01400.

- B. Hire and pay for an independent inspection and testing firm to observe and perform field compaction tests on the bearing surfaces to determine if the existing soils are adequate for a bearing surface for the proposed structure. If the existing soils are found not to be adequate, the independent firm shall provide recommendation on the course of action required to correct the situation. The building foundation has been designed for an allowable soil bearing capacity of 2,000 psf.

END OF SECTION

## SECTION 02320

### BACKFILLING AND COMPACTING

#### PART 1 GENERAL

##### 1.01 WORK INCLUDED

- A. Backfilling to subgrade elevations around building foundations.
- B. Compaction requirements.

##### 1.02 RELATED WORK

- A. Section 01400 - Quality Requirements.
- B. Section 02315 - Excavation.

##### 1.03 REFERENCES

- A. ANSI/ASTM C136 - Sieve Analysis of Fine and Coarse Aggregates.
- B. ANSI/ASTM D698 - Moisture-Density Relations of Soils and Soil-Aggregate Mixture Using 5.5 lb 2.49 kg Rammer and 12-inch Drop.
- C. ANSI/ASTM D1557 - Moisture-Density Relations of Soils and Soil-Aggregate Mixture Using 10 pound Rammer and 18-inch Drop.

#### PART 2 PRODUCTS

##### 2.01 COMMON FILL MATERIALS

- A. Type A: Subsoil; Existing, free of all topsoil and organic material, roots, gravel larger than 3-inch size, and debris may be used to backfill around building foundations.
- B. Type B: Imported borrow, sand, conforming to the gradations required in standard spec 209.
- C. Type C: Imported borrow, aggregate base course, 3/4-inch dense graded base, crushed stone or crushed gravel conforming to the gradations required in standard spec 305.2.2.1.

#### PART 3 EXECUTION

##### 3.01 INSPECTION

- A. Verify foundation or basement walls are braced to support surcharge forces imposed by backfilling operations.

- B. Verify areas to be backfilled are free of debris, snow, ice, or water, and ground surfaces are not frozen.

### 3.02 BACKFILLING

- A. Backfill areas to contours and elevations. Use unfrozen materials.
- B. Backfill systematically, as early as possible, to allow maximum time for natural settlement. Do not backfill over porous, wet, or spongy subgrade surfaces.
- C. Place and compact fill materials in continuous layers not exceeding 8 inches loose depth.
- D. Maintain optimum moisture content of backfill materials to attain required compaction density.
- E. Backfill simultaneously on each side of unsupported foundation walls.
- F. Slope grade away from building minimum 2 inches in 10 feet unless noted otherwise.
- G. Make changes in grade gradual. Blend slopes into level areas.
- H. Remove surplus backfill materials from site.
- I. Leave stockpile areas completely free of excess fill materials.

### 3.03 TOLERANCES

- A. Top Surface of Backfilling: Plus or minus 1 inch.
- B. Allow adequate space for topsoil or paving.

### 3.04 FIELD QUALITY CONTROL

- A. Field inspection and testing shall be performed under the provisions of Section 01400.
- B. Hire and pay for an independent inspection and testing firm to perform field compaction tests on the compacted backfill materials.
- C. If compaction tests on backfill material indicate work does not meet specified requirements, remove work, replace and retest at no cost to owner.

### 3.05 SCHEDULE OF LOCATIONS

- A. The paragraphs below identify location, fill material to be used and compaction expressed as a percentage of maximum density with ANSI/ASTM D1557.

- B. Interior Slab-On-Grade: One 6 inch minimum layer of Type C directly under the slab and Type B or C for fill to raise the grade up to that point, each lift compacted to 95 percent.
- C. Around Foundations Within the Building Area: Type B, each lift compacted to 95 percent.
- D. Fill Under Grass Areas at Exterior Side of Perimeter Foundation Walls: Type A or B, compacted to 90 percent, compacted to 95 percent within 10 feet of foundation walls.
- E. Fill Under Concrete Paving at Exterior Side of Perimeter Foundation Walls: Type B, compacted to 95 percent.
- F. Fill Under Asphalt Paving at Exterior Side of Perimeter foundation Walls: Type B, compacted to 95 percent.
- G. Fill Under Concrete Sidewalks: Type B or C, provide 6-inch thick layer, compact to 95 percent.

END OF SECTION



## DIVISION 3 - CONCRETE

### SECTION 03100

#### STRUCTURAL CAST-IN-PLACE CONCRETE FORMING (BUILDING)

##### PART 1 GENERAL

###### 1.01 DESCRIPTION OF WORK

- A. The work covered under this section shall consist of furnishing all materials, equipment and labor required to furnish all formwork for cast-in-place concrete as shown on the contract drawings and specified herein.
- B. The work shall include formwork, shoring for cast-in-place concrete, and installation into formwork of items by other such as anchor bolts, setting plates, bearing plates, anchorages, frames, and other items to be embedded in concrete.

###### 1.02 APPLICABLE PUBLICATIONS

- A. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto.
  - 1. American Concrete Institute (ACI) Annual Book of ACI Standards:
    - a. ACI 117/177R - Specifications for Tolerances for Concrete Construction and Materials and Commentary, Current Edition.
    - b. ACI 301 - Specifications for Structural Concrete, Current Edition.
    - c. ACI 302.1R - Guide for Concrete Floor and Slab Construction, Current Edition.
    - d. ACI 311.4R - Guide for Concrete Inspection, Current Edition.
    - e. ACI 318 - Building Code Requirements for Structural Concrete, Current Edition.
    - f. ACI 347 - Guide to Formwork for Concrete, Current Edition.
    - g. ACI ASCC-1(05) - The Contractor's Guide to Quality Concrete Construction, Third Edition.
    - h. ACI SCM-24 - Concrete Repair Basics, Current Edition.
    - i. ACI SP-4 - Formwork for Concrete, Current Edition.
    - j. ACI SP15 - Field Reference Manual: Standard Specifications for Structural Concrete ACI 301 with Selected ACI Reference, Current Edition.
    - k. ACI SP-71 - ASTM Standards in ACI 318, Current Edition.
  - 2. American Plywood Association (APA) Specifications and Standards:
    - a. APA PS1 - Plywood Design Specification, Current Edition.

## PART 2 PRODUCTS AND MATERIALS

### 2.01 DESIGN

- A. The design and engineering of the formwork and its accessories shall be the responsibility of the contractor. Formwork shall be designed, erected, supported, braced and maintained so as to safely support all vertical and lateral loads until such loads can be supported by the concrete structure.
- B. Determination of loads and design shall be in accordance to ACI 301 and ACI 347.

### 2.02 FORMS

- A. Forms may be wood, plywood, concrete-form-grade hardboard, metal or other acceptable material which will produce smooth, true surfaces.
  - 1. Provide lumber dressed on at least two edges and one side for tight fit.
  - 2. Metal forms shall have smooth surfaces free from any pattern, irregularities, dents, bends and sags.

### 2.03 SHORING

- A. All shoring members shall be of such design and material to safely support all dead and working loads throughout the placing and curing period. Shoring shall be placed to prevent sagging and settlement.

### 2.04 FORM TIES AND ACCESSORIES

- A. Form ties shall be factory-fabricated, adjustable-length, removable or snapoff metal, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.
- B. For exposed concrete surfaces, provide ties so that the portion remaining with the concrete after removal is 1 inch to 1-1/2 inches inside the finished face of the concrete.
- C. Unless otherwise indicated, provide form ties which will not leave holes larger than 1 inch in diameter in concrete surfaces.

### 2.05 FORM COATING COMPOUND

- A. Form coating compound shall be a commercial formulation that will not bond with, stain, nor adversely affect concrete surfaces and not impede the wetting of surfaces to be cured with water or curing compounds. Forms for concrete surfaces requiring subsequent treatment shall receive a type of coating that will not impair bond or adhesion.
- B. Form coating compound for steel forms shall conform with all requirements stated above and shall be of rust-preventative type.

## PART 3 CONSTRUCTION METHODS

### 3.01 GENERAL

- A. Responsibility. The design and construction of formwork shall be the sole responsibility of the contractor.
- B. Earth forms are not acceptable or permitted.
- C. Construct forms to the exact sizes, shapes, lines and dimensions shown, as required to obtain accurate alignment, location, grades, level and plumb in finished construction and to maintain tolerances in accordance to ACI 301. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required. Chamfer all corners of concrete exposed to view using chamfer strips. Use selected materials to obtain required finishes.
- D. Forms shall be sufficiently tight to prevent leakage of concrete. Temporary openings shall be provided in the inside form of all wall forms and in column forms to facilitate cleaning and inspection immediately before placing concrete.
- E. Assemble forms so their removal will not damage concrete and adjacent materials.

### 3.02 FORMWORK

- A. Forms shall conform in general to shape, line, grade and dimensions of members as shown on contract drawings, and shall have the strength and stability to ensure finished concrete within the tolerances specified in ACI 347.
  - 1. Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from those other trades.
  - 2. Exterior edges of all exposed concrete, unless otherwise specified, shall have a chamfer strip placed in form to provide bevel of sharp edges. Chamfer strips shall be 3/4-inch by 3/4-inch by 45° wood, plastic, or rubber.
  - 3. Accurately place and secure in position, prior to placing concrete, all anchors, bolts, inserts and other items furnished under other sections of the specifications and for other contractors on the project.
- B. Formwork shall be mortar-tight and sufficiently rigid to prevent displacement or sagging between supports.
- C. Formwork shall be properly braced or tied together so as to maintain position and shape and ensure safety to workman and passersby.
- D. Temporary openings may be provided on all wall and column forms to limit the free fall of the concrete to less than 4 feet and should be so located as to facilitate the placing and consolidation of the concrete. The ports shall be spaced no more than 6 feet apart to limit the horizontal flow of concrete.

- E. All forms shall be cleaned and rubbed smooth prior to placing to ensure true forming surfaces for all concrete surfaces.

### 3.03 FORM TIES AND ACCESSORIES

- A. Internal wall ties shall contain positive stops at the required wall thickness. The exterior clamp portions of the pipe shall be adjustable to permit tightening of forms. Ties shall provide a positive disconnection 1 inch to 1-1/2 inches inside the finished face of the concrete. Cutting ties back from face of wall or use of wire ties will not be permitted. All tie and plug holes shall be filled with non-shrink grout after forms are removed.
- B. Accessories shall be used only for the purpose intended and shall in no way interfere with the placing of concrete. Removal of accessories shall in no way impair or disturb finish concrete surfaces. Accessories shall be compatible with formwork and ties and shall maintain the watertight integrity of the formwork system.
- C. Design of all form ties and accessories shall be adequate for all concrete placement, horizontal and vertical, to prevent failures and blowouts.

### 3.04 FORM COATINGS

- A. Coat form contact surfaces with form bond breaker compound before reinforcement is placed. Do not allow excess form coating material to accumulate in the forms or to come into contact with surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.
- B. Coat steel forms with form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.
- C. Clean reinforcing steel that has become contaminated with form coating to the satisfaction of the engineer prior to placing concrete.

### 3.05 EMBEDDED ITEMS

- A. Items embedded in concrete shall be properly cleaned to be free from oil or foreign matter that would weaken the bond of the concrete to these items.
- B. Install in the formwork requisite anchors, sleeves and other items specified under other sections of these specifications; close end conduits, piping and sleeves embedded in concrete with caps or plugs.
- C. Conduits or pipes embedded in slabs of larger outside diameter than 1-1/2 inches, or when pipes and conduits come closer than 1 inch from either the upper or lower surface of the slab, provide expanded metal or wire mesh laid and extended beyond conduit or piping at least 8 inches on all sides; space conduits or pipes closer than

3 diameters on centers, place to avoid changing locations of reinforcement for indicated locations.

### 3.06 CONSTRUCTION JOINTS

- A. Make construction joints where indicated on the contract drawings; additional construction joints are subject to prior approval of the engineer; locate additional construction joints to least impair the strength of the structure.
- B. Form keyways and joints as indicated on the contract drawings.
- C. Continue reinforcing steel and wire fabric across construction joints, unless noted otherwise.

### 3.07 EXPANSION JOINTS

- A. Expansion joints shall be placed where indicated on the contract drawings; reinforcement, corner protection angles or other fixed metal items embedded in or binded to continuously shall not extend through expansion joints; finish concrete slab edges along expansion joints neatly with slightly rounded edging tool; leave joints in the completed work carefully tooled and free of mortar and concrete.
- B. Joints between slabs on earth and vertical surfaces, including columns, piers, walls, and other fixed structures shall have expansion joint material placed on abutting vertical surfaces.
- C. Joints to receive joint compound shall have premolded expansion filler strips at proper level placed below finished floor with slightly tapered, dressed, oiled wood strip secured temporarily to top thereof; install wood strip of depth to form groove at least 1 inch deep; after concrete has set, remove strip; fill groove with light colored joint compound for poured application; fill joint grooves flush, to be slightly concave, after drying as specified in Joint Sealers - Division 07.

### 3.08 CONTROL JOINTS

- A. Install vertical control joints as indicated on the contract drawings; locate specifically as follows:
  - 1. At each control joint, extend only alternate horizontal reinforcement bars through the joint; seal control joints with concrete colored joint compound.
- B. Install control (contraction) joints in slabs as indicated on the contract drawings, as follows:
  - 1. At each joint, cut reinforcing mesh so only alternate wires extend through joint.
  - 2. Provide 1/4 inch wide saw - cut control joints to a depth equivalent to 1/3 the slab thickness; cut as soon as the slab will support the weight of the saw and operator and not damage the surface and not more than 8 hours after completion of concrete placement.

- C. Apply joint compound to all control and construction joints after concrete has sufficiently cured; clean joint slot; fill joint with light colored compound for poured application; fill joint grooves flush, to be slightly concave after drying, as specified in Joint Sealers - Division 07.

### 3.09 FORM/SHORING REMOVAL

- A. Arrange forms to allow stripping without removal of principal shores, where required to remain in place.
- B. Removal of forms shall be accomplished in such a manner as will prevent injury to concrete and ensure complete safety of structure. Removal times listed below are minimum and may be increased by the engineer as job conditions warrant.
  - 1. Where structure as a whole is supported on shores, vertical forms such as beam and girder sides and similar vertical forms may be removed 24 hours after completion of pour, providing concrete has hardened sufficiently to sustain its own weight and to prevent injury.
  - 2. Wall forms shall not be removed in less than 24 hours after pouring, unless otherwise required for curing.
  - 3. Supporting forms and shoring must remain in place until concrete can carry any loads to be imposed upon it and in no case shall be removed in less than 7 days.
  - 4. Forms ties, requiring any operation in removal of forms which would tend to destroy bond between tie and concrete in order to remove form, shall not be disturbed for 7 days after completion of pour.
  - 5. The time periods stipulated above may be reduced if strength results of concrete so indicate adequate conditions.
- C. Notify the engineer before the forms are removed in order that an examination of the newly-stripped surfaces may be made prior to patching.
- D. Make repairs uniform in color and finish with surrounding concrete.

### 3.10 EXPOSED SURFACES

- A. Exposed surfaces shall be Carborundum rubbed to take off fins; fill pores, stone pickets, honeycombs, etc., with non shrink grout as follows:
  - 1. Repair immediately after form removal and inspection by the engineer.
  - 2. Remove concrete surrounding defect to sound concrete, then wet affected area.
  - 3. Brush on bonding agent, mixed and applied in accordance to manufacturer's recommendations.
  - 4. Consolidate patch grout and strike off to leave the patch slightly higher than the surrounding surface.
  - 5. Finish the repaired area flush with the surrounding area after the patch has been in place for one hour, or as prescribed by the manufacturer.

- B. Perform patching before curing compound is applied; cure patched areas in the same manner as adjacent concrete; make repairs uniform in color and finish with surrounding concrete.
- C. Exposed surfaces shall be protected from excessive sun, wind and rain, and kept wet until curing compound is applied. When ambient temperature falls below 40°F heat aggregate and mixing water; clear all forms, reinforcement and subgrade of snow and ice; cover all freshly placed concrete with tarpaulins, and provide heat to maintain a temperature of 70°F for at least three days or 50°F for five days; rate of cooling after end of protection period shall be accomplished in a manner approved by the engineer.

### 3.11 REUSE OF FORMS

- A. Clean and repair surfaces of forms to be re-used in the work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable. Apply new form coating compound material to concrete contact surfaces as specified for the new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close all joints. Align and secure joints to avoid offsets.
- C. Do not use “patched” forms for concrete surfaces exposed to view.

END OF SECTION

## SECTION 03200

### CONCRETE REINFORCING (BUILDING)

#### PART 1 GENERAL

##### 1.01 DESCRIPTION OF WORK

- A. The work under this section shall cover furnishing and installing concrete reinforcing as shown on the contract drawings and as specified herein.

##### 1.02 APPLICABLE PUBLICATIONS

- A. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto.
  - 1. American Concrete Institute (ACI) Specifications and Standards:
    - a. ACI 315 - Manual of Standard Practice for Detailing Reinforced Concrete Structures, Current Edition.
    - b. ACI 318 - Building Code Requirements for Structural Concrete and Commentary, Current Edition.
  - 2. American Society for Testing and Materials (ASTM), Annual Book of ASTM Standards:
    - a. ASTM A82 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement, Current Edition.
    - b. ASTM A184 - Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement, Current Edition.
    - c. ASTM A185 - Standard Specification for Steel Welded Wire Reinforced, Plain for Concrete, Current Edition.
    - d. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement, Current Edition.
  - 3. American Welding Society (AWS), Specifications and Standards:
    - a. AWS D12.1 - Welding Reinforcing Steel, Metal Inserts, and Connections in Reinforced Concrete Construction, Current Edition.
  - 4. American Association of State Highway Transportation Officials (AASHTO), Specifications and Standards:
    - a. AASHTO M182 - Specification for Burlap Cloth Made from Jute or Kenaf, Current Edition
  - 5. Concrete Reinforcing Steel Institute (CRSI) Specifications and Standards:
    - a. CRSI - Manual of Standard Practice, Current Edition.
    - b. CRSI - Recommended Practice for Placing Reinforcing Bars, Current Edition.
    - c. CRSI - Recommended Practice for Placing Bar Supports, Specifications and Nomenclature, Current Edition.
    - d. CRSI - Recommended Practice for Reinforcing Bar Splices, Current Edition.



## PART 2 PRODUCTS AND MATERIALS

### 2.01 REINFORCEMENT

- A. Steel Bar Reinforcement. Main reinforcing and stirrups; ASTM A615, Grade 60.
- B. Welded Wire Fabric. Welded wire fabric, ASTM A185, 6 x 6 - W1.4 /W1.4, unless otherwise specified or indicated on the contract drawings.
- C. Steel Tie Wire. Steel tie wire, ASTM A82, plain, cold-drawn, 16 gauge or heavier.
- D. Supports For Reinforcement. Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcement in place complying with CRSI Manual of Standard Practice. For slabs on grade where base material will not support chairs, use supports with sand plates or horizontal runners to locate mesh properly in slab.

## PART 3 CONSTRUCTION METHODS

### 3.01 FABRICATION

- A. Fabricate and place to shapes and dimensions indicated or required to carry out intent of contract drawings and these specifications.
- B. Bends for stirrups and ties shall be made around a pin having a diameter not less than four times the diameter of reinforcing bar. Bends for other bars shall be made around a pin having a diameter not less than six times diameter of bar, except that for bars larger than 1 inch, pin shall be not less than eight times diameter of bar.
  - 1. Perform cutting and bending in the shop; bend and cut steel cold. Heating of reinforcement will not be permitted. Do not bend or straighten bars in a manner that will injure the material.
  - 2. Field bending of bars shall not be allowed without the engineer's approval.
- C. Tagging shall be with metal, linen, or rope fiber tags filled in with machine or waterproof ink. Paper tags shall not be allowed.
- D. Reinforcing bars shall conform accurately to the dimensions shown on the contract drawings.

### 3.02 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. For reinforcing steel fabricated on-site, shop from the mill in bundles, limited to one size and length, tagged with a waterproof tag showing the name of the mill, heat number, grade and size of the bars and identifying number.
- B. For reinforcing steel fabricated off-site, deliver in bundles identified as to structure and shop drawing number. Identify each individual bar with a waterproof tag showing the grade, size and bar mark from the approved bar schedule.

- C. Protect reinforcing steel and wire fabric from damage and from dirt, oil grease, other foreign matter, and rust-causing condition. Do not store reinforcement in direct contact with the ground.

### 3.03 CLEANING

- A. Before placing and before pouring concrete, all reinforcement shall be thoroughly cleaned of all oil, dirt, loose mill scale, loose rust, or foreign matter that will destroy or reduce bond.

### 3.04 PLACING REINFORCEMENT

- A. Placement. Metal reinforcement shall be accurately placed in accordance to approved Submittals and adequately secured in position by concrete or metal chairs or spacers. Nails shall not be driven into forms to support reinforcement nor shall wire ties come in contact with forms.
- B. Splicing. Lap at splices shall be sufficient to transfer stress between bars by bond and shear.
  - 1. Furnish reinforcing bars in full lengths as indicated on the contract drawings and approved Submittals.
  - 2. Do not splice bars unless indicated on the contract drawings or approved by the engineer in writing. When authorized, make splices in accordance to ACI 318; perform welding in accordance to AWS D12.1.
  - 3. Splices generally shall be avoided at points of maximum stress. Minimum splice lap for stressed bars shall be forty times bar diameter.
- C. Offsets in longitudinal bars at change of cross section shall be placed in region of lateral support. Slope of inclined portion of offset shall not be more than one in six and, in tied columns, ties shall be spaced not over 3 inches on centers for a distance of 1 foot below actual point of offset.
- D. Embedded Items. The contractor shall provide for the installation of all items embedded in the concrete, such as coil rod inserts, anchor bolts, dowels, etc., as shown on the contract drawings or as provided for in other Divisions of these specifications.
  - 1. All dowel bars shall be tied securely in place before pouring concrete.
  - 2. Provide for clearances with appurtenant materials and devices.
- E. Drilled and Grouted Dowel Installation. Existing concrete which will be incorporated into new work and requiring integration with new concrete will be doweled as indicated on the contract drawings and as follows:
  - 1. Drill hole in existing concrete of size that is 3/4 inch larger in diameter than diameter of dowel bar. Incline the hole in the concrete such that the non-shrink grouting or epoxy will be retained in the hole.
  - 2. Fill hole with non-shrink grouting or epoxy.
  - 3. Immediately place dowel bar into hole.
  - 4. Allow grout or epoxy to take initial set before disturbing dowel bar.

- F. Steel Reinforcing Fabric. Reinforce as detailed on the contract drawings; and where not indicated, reinforce with wire fabric, place 2 inches from the top of the slab.
1. Flat sheets shall be used whenever available. Wire fabric shall lap 6 inches on side joints and 12 inches on end joints. Properly secure with annealed wire. Fabric shall be raised and secured in the correct location using permanent supports. Raising the fabric by hook during placement of concrete shall NOT be permitted.
  2. Alternately, in tight quarters and around appurtenances and openings, lap mesh reinforcement not less than one mesh space plus 2 inches, and tie.
- G. Concrete Cover. The minimum cover of concrete for all reinforcement shall conform to the dimensions indicated on the contract drawings, which indicate the clear distance from the edge and end of the reinforcement to the face of the concrete surface. Provide clearance and spacing indicated on the contract drawings and approved Submittals, where so indicated.
1. Where no clearances are indicated, the thickness of the concrete cover over reinforcement shall be as follows:
    - a. Concrete cast against and permanently exposed to earth - 3 inches;
    - b. Formed concrete exposed to earth or weather - 2 inches;
    - c. Formed concrete not exposed to earth or weather - 1-1/2 inches;
    - d. Slabs not exposed to earth or weather - 1 inch.

END OF SECTION

## SECTION 03250

### CONCRETE ACCESSORIES (BUILDING)

#### PART 1 GENERAL

##### 1.01 DESCRIPTION OF WORK

- A. The work under this section shall cover furnishing and installing concrete accessories as shown on the contract drawings and specified herein.

##### 1.02 APPLICABLE PUBLICATIONS

- A. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto.
  - 1. American Society for Testing and Materials (ASTM), Annual Book of ASTM Standards:
    - a. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete, Current Edition.
    - b. ASTM C272 - Standard Test Method for Water Absorption of Core Materials for Structural Sandwich Constructions, Current Edition.
    - c. ASTM C881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete, Current Edition.
    - d. ASTM C882 - Standard Test Method for Bond Strength for Epoxy-Resin Systems Used with Concrete by Slant Shear, Current Edition.
    - e. ASTM D6 - Standard Test Method for Loss on Heating of Oil and Asphaltic Compounds, Current Edition.
    - f. ASTM D297 - Standard Test Methods for Rubber Products - Chemical Analysis, Current Edition.
    - g. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type), Current Edition.
    - h. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types), Current Edition.
    - i. ASTM E154 - Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover, Current Edition.
    - j. ASTM E1643-98 - Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
    - k. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs.
  - 2. Federal Specification TTS 227 and TTS 230, Current Edition.

### 1.03 SUBMITTALS

- A. Contractor shall submit such product literature and catalog cuts of materials to be supplied to the rate these materials to the specifications. Information shall be in conformance with requirements of Submittals - Division 01 of these specifications.

## PART 2 PRODUCTS AND MATERIALS

### 2.01 EXPANSION AND CONTRACTION JOINT FILLER

- A. Preformed Bituminous. Bituminous expansion and contraction joint filler shall be preformed bituminous strips which complies with ASTM D994.
- B. Preformed Sponge Rubber. Sponge rubber expansion and contraction joint filler shall be preformed which complies with ASTM D1752.

### 2.02 BOND BREAKER

- A. Cast-in-Place Concrete Flatwork. Asphalt impregnated felts, 15 pound.

### 2.03 VAPOR BARRIER

- A. Under Slab Vapor Barrier: Class C, ASTM E-1745; 3-ply laminate with two layers of high-density polyethylene and a high-strength cord grid; vapor retarder tape and pipe boots; Griffolyn Type-65 by Reef Industries or Stego Wrap Class C Vapor Retarder by Stego Industries.
- B. Seam Tape: High density polyethylene tape with pressure sensitive adhesive, minimum 4 inches wide. Tape or Mastic by vapor barrier manufacturer.
- C. Pipe Boots:
  - 1. Premanufactured pre-cut pipe boots from vapor barrier manufacturer.
  - 2. Where premanufactured boots are not suitable, construct pipe boots from vapor barrier material and pressure sensitive tape per manufacturer's instructions.

### 2.04 WATERPROOF SHEET MATERIAL FOR CURING

- A. Provide one of the following, complying with ASTM C171: waterproof paper, polyethylene film or polyethylene-coated burlap.
- B. Use only materials which are resistant to decay when tested in accordance to ASTM E154, as follows:
  - 1. Polyethylene sheet not less than 6 mils thick; or
  - 2. Water resistant barrier paper consisting of heavy papers laminated together with glass fiber reinforcement and overcoated with black polyethylene on each side.

## 2.05 CURING AND SEALING COMPOUND - INTERIOR

- A. Membrane-forming curing compound shall meet the moisture retention requirements of ASTM C309, Type 1. Kure 200W, Sonneborn Division of BASF; Sealtight CS-309 Curing and Sealing Compound, W.R. Meadows, Inc.; Eucocure, Euclid Chemical Co.; or equal.
- B. Shall be compatible with surface finish.

## 2.06 CURING COMPOUND - EXTERIOR

- A. Curing compound shall comply with ASTM C309, Type 2; resin, white pigmented.

## 2.07 CONCRETE REPAIR COMPOUND

- A. Concrete repair compound shall be Sonopatch, Sonneborn Building Products; Embeco 411 Mortar, Master Builders, or equal.

## 2.08 PIPE SLEEVES

- A. Shall be furnished, installed, and anchored solid in their final location.

# PART 3 CONSTRUCTION METHODS

## 3.01 INSTALLATION

- A. Install accessories where shown on contract drawings and as specified herein.
- B. Place bond breaker at junctures of slabs-on-grade with vertical walls.
- C. Install under-slab vapor barrier at locations shown on Drawings in accordance to manufacturer's instructions and ASTM E1643-98. Unroll vapor barrier with the longest dimension parallel with the direction of the pour. Lap vapor barrier over footings and seal to foundation walls, unless shown otherwise on Drawings. Overlap joints 6-inches and seal with manufacturer's tape. Seal all penetrations (including pipes) with manufacturer's pipe boot. No penetrations of the vapor barrier are allowed except for reinforcing and permanent utilities. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6-inches and taping all four sides with tape.
- D. Seal all exposed surfaces of expansion and contraction joints with joint sealer (3/4 inch deep and hold 1/8 inch below surface of concrete).

END OF SECTION

## SECTION 03 30 00

### CAST-IN-PLACE CONCRETE (BUILDING)

#### PART 1 GENERAL

##### 1.01 DESCRIPTION OF WORK

- A. The work covered under this section shall cover furnishing all materials, equipment and labor required to construct all cast-in-place concrete as shown on the contract drawings and as specified.
- B. The work under this section shall cover sampling and testing of concrete to determine the materials conformance and work conformance to the requirements specified for cast-in-place concrete.

##### 1.02 APPLICABLE PUBLICATIONS

- A. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto.
  - 1. American Concrete Institute (ACI), Annual Book of ACI Standards:
    - a. ACI 117/177R - Standard Specification for Tolerances for Concrete Construction and Materials and Commentary, Current Edition.
    - b. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete, Current Edition.
    - c. ACI 209.1R - Report on Factors Affecting Shrinkage and Creep of Hardened Concrete, Current Edition.
    - d. ACI 301 - Specification for Structural Concrete, Current Edition.
    - e. ACI 302.1R - Guide for Concrete Floor and Slab Construction, Current Edition.
    - f. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete, Current Edition.
    - g. ACI 305R - Hot Weather Concreting, Current Edition.
    - h. ACI 306.1 (R2002) - Standard Specification for Cold Weather Concreting, Current Edition.
    - i. ACI 308R - Guide to Curing Concrete, Current Edition.
    - j. ACI 309R - Guide for Consolidation of Concrete, Current Edition.
    - k. ACI 311.4R - Guide for Concrete Inspection, Current Edition.
    - l. ACI 318/318R - Building Code Requirements for Structural Concrete and Commentary, Current Edition.
    - m. ACI 530/530.1/530R/530.1R - Building Code Requirements for Commentary for Masonry Structures and Specification for Masonry Structures and Related Commentaries, Current Edition.
    - n. ACI ASCC-1(05) - The Contractor's Guide to Quality Concrete Construction, Third Edition.

- o. ACI CP-10/PACK - Craftsman Study Package for ACI Certification of Concrete Flatwork Technician/Finisher, Current Edition.
- p. ACI MCP06 - ACI Manual of Concrete Practice, Parts 1 through 6, and Index, 2006 Edition.
- q. ACI SCM-24 - Concrete Repair Basics, Current Edition.
- r. ACI SP4 - Formwork for Concrete, Current Edition.
- s. ACI SP15 - Field Reference Manual: Standard Specifications for Structural Concrete ACI 301 with Selected ACI Reference, Current Edition.
- t. ACI SP-71 - ASTM Standards in ACI 318, Current Edition.
- 2. American Society for Testing and Materials (ASTM), Annual Book of ASTM Standards:
  - a. ASTM C33 - Standard Specification for Concrete Aggregates, Current Edition.
  - b. ASTM C70 - Standard Test Method for Surface Moisture in Fine Aggregate, Current Edition.
  - c. ASTM C94 - Standard Specification for Ready-Mixed Concrete, Current Edition.
  - d. ASTM C109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (using 2-inch or [50 mm] Cube Specimens), Current Edition.
  - e. ASTM C125 - Standard Terminology Relating to Concrete and Concrete Aggregates, Current Edition.
  - f. ASTM C127 - Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Coarse Aggregate, Current Edition.
  - g. ASTM C128 - Standard Test Method for Density, Relative Density (Specific Gravity) and Absorption of Fine Aggregate, Current Edition.
  - h. ASTM C131 - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine, Current Edition.
  - i. ASTM C143 - Standard Test Method for Slump of Hydraulic-Cement Concrete, Current Edition.
  - j. ASTM C150 - Standard Specification for Portland Cement, Current Edition.
  - k. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete, Current Edition.
  - l. ASTM C191 - Standard Test Methods for Time Setting of Hydraulic Cement by Vicat Needle, Current Edition.
  - m. ASTM C219 - Standard Terminology Relating to Hydraulic Cement, Current Edition.
  - n. ASTM C226 - Standard Specification for Air-Entraining Additions for Use in the Manufacture of Air-Entraining Hydraulic Cement, Current Edition.



- o. ASTM C233 - Standard Test Method for Air-Entraining Admixtures in Concrete, Current Edition.
- p. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete, Current Edition.
- q. ASTM C311 - Standard Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for use as a Mineral Admixture in Portland-Cement Concrete, Current Edition.
- r. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete, Current Edition.
- s. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete, Current Edition.
- t. ASTM C535 - Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine, Current Edition.
- u. ASTM C566 - Standard Test Method for Total Evaporable Moisture Content of Aggregate by Drying, Current Edition.
- v. ASTM C595 - Standard Specification for Blended Hydraulic Cement, Current Edition.
- w. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete, Current Edition.
- x. ASTM C688 - Standard Specification for Functional Additions for Use in Hydraulic Cements, Current Edition.
- y. ASTM C989 - Standard Specification for Slag Cement for Use in Cement and Mortars, current edition.
- 3. Portland Cement Association (PCA) Standards and Specifications:
  - a. PCA - Design and Control of Concrete Mixtures, Current Edition.

### 1.03 SUBMITTALS

- A. Submit such product literature and catalog cuts of materials to be supplied to relate these materials to the specification. Information shall be in conformance with requirements of Submittals - Division 01 of these specifications.
- B. Concrete Design Mix
  - 1. Prior to the start of placing of concrete, submit the design mix for each class of concrete, indicating that the concrete constituents and proportions will result in a concrete mix meeting the physical requirements for each class of concrete specified. Submit with the design mix, laboratory test reports and manufacturer's certificates attesting the conformance of constituents with these specifications.
  - 2. Do not vary the proportions of the constituents or source of material of the approved mix without submitting corresponding test result documentation to the engineer for review and approval.
  - 3. Design mix shall indicate proportions of cement, aggregate and water, and names and proportions of admixtures and air-entraining agents.
  - 4. Provide certification that the design mix complies with all ACI and ASTM requirements.

## PART 2 PRODUCTS AND MATERIALS

### 2.01 CEMENT

- A. Cement shall be Portland Cement ASTM C150 Type I or IA, except as otherwise noted or approved. Type III cement shall only be used for Class L concrete, or when approved by the engineer.
- B. A singular brand and manufacturer of cement shall be used for the entire work.

### 2.02 FLY ASH

- A. Fly ash shall conform to ASTM C618 Class C.
- B. A singular source of fly ash shall be used for the entire work.

### 2.03 SLAG

- A. Slag shall be ground granulated blast furnace slag conforming to ASTM C989.

### 2.04 AGGREGATE

- A. Aggregate shall consist of clean, hard durable sand, gravel, crushed gravel or crushed rock.
- B. Aggregate shall conform to the requirements of ASTM C33. Fine and coarse aggregate shall meet ASTM C33 grading requirements. Coarse aggregates shall be graded in accordance to ASTM gradations as follows:
  - 1. 3/4 inch maximum coarse aggregate - ASTM No. 67
  - 2. 1-1/2 inch maximum coarse aggregate - ASTM No. 467
- C. Maximum aggregate size shall be as defined in the Concrete Schedule, or where not defined in the Concrete Schedule, as defined by dimensional constraints for cast-in-place concrete as follows.
  - 1. Not larger than one-fifth of the narrowest dimension between sides of the forms;
  - 2. Not larger than one-third the thickness of the slab;
  - 3. Not larger than three-fourths of the minimum clear spacing between individual reinforcing bars or wire, bundles of bars, or prestressing tendons or ducts.

### 2.05 MIXING WATER

- A. Mixing water shall be natural or treated water, clean and free from injurious amount of oil, acid, alkali, chlorides and sulfates, other common salts, organic matter or other deleterious substances.

- B. Mixing water shall yield cement paste complying with the requirements ASTM C109 and ASTM C191.

## 2.06 ADMIXTURES

- A. All admixtures are subject to the written approval of the engineer and shall be used in strict accordance with the manufacturer's recommendations.
  - 1. Air-Entraining Admixture
    - a. All concrete exposed to weather and freeze-thaw cycles shall be air-entrained, unless otherwise specified.
    - b. Air-Entraining admixture shall conform to ASTM C260.
    - c. Air-Entrainment shall be as indicated for each class as in the Concrete Schedule.
  - 2. Water-Reducing, Set-Controlling Admixtures
    - a. Water-Reducing, Set-Controlling admixtures shall conform to ASTM C494, Type A for water-reducing, Type C for accelerating, Type D for water-reducing and retarding, and Type E for water-reducing and accelerating.
- B. Admixtures containing calcium chloride or soluble chloride shall not be used.

## PART 3 CONSTRUCTION METHODS

### 3.01 COORDINATION

- A. Examine the drawings and specifications for work of other sections or other contractors and coordinate such work with the requirements of this Section; make provisions for installation of such items as sleeves, pipes, conduits, inserts and hangers in a manner that will not impair or weaken concrete construction.

### 3.02 READI-MIX CONCRETE

- A. Acceptability and Use. Read-mix concrete shall be designed on the basis of strength, durability, impermeability, and exposure condition, as required for the intended use of the structure by methods specified in ACI 211.1 and ACI 318. All read-mix concrete shall comply with the water-cement ratio for each specific class of concrete as specified in the Concrete Schedule. Concrete design mix, complete with sample test results shall be submitted to the engineer for approval prior to placing any concrete.
  - 1. Failure to Meet Strength Requirements. Failure to meet strength requirements shall be as defined in Concrete Quality Control- Division 01 of these specifications.
  - 2. Watertight Concrete. All concrete exposed to earth or water shall be watertight, shall have a water-cement ratio as specified, and shall be air-entrained as specified in the Concrete Schedule.
    - a. Construct keyways as indicated on the contract drawings.
    - b. Provide damp-proofing membrane as indicated on the contract drawings.

- B. Mix Proportioning. Mix proportioning shall be the responsibility of the contractor and shall be submitted for review and approval by the engineer, in accordance to these specifications.
1. Select proportions for concrete to obtain the quality requirements for the class of concrete as specified in the Concrete Schedule. Contractor, at their expense, shall have an approved independent laboratory prepare design mixes for each specified concrete class.
  2. Slump. Slump for class of concrete shall be as specified in the Concrete Schedule. The contractor shall at their expense, make field slump tests in accordance to ASTM C143 and Concrete Quality Control-Division 01 of these specifications.
  3. Adjustment to Concrete Mixes. Design mix adjustments may be requested by the contractor when characteristics of materials, conditions, weather, test results, or other circumstances warrant. Laboratory test data for revised design mixes and strength results shall be submitted and approved before using in the work. No change in contract price will be allowed for these changes.
  4. Addition of Water to the Batch. Addition of water to the batch delivered to the site shall be in strict accordance with ASTM C94. This shall be the contractor's responsibility and by their direction, following consultation with the engineer.
    - a. Addition of water to the batch shall be one time only. Total gallons of water added to the batch shall be recorded on the load ticket, which shall be supplied to the engineer prior to that delivery truck leaving the site. If water is permitted to be added to mixed concrete upon arrival at the job, an additional mixing of 30 revolutions of the drum shall be required.
    - b. Contractor shall adjust the water-cement ratio of the batch to the corresponding value based on the addition of water to the batch and shall submit this information to the engineer with adjusted strength data for the final batch proportion.
    - c. At no time shall the addition of water cause the water-cement ratio specified in the concrete class schedule to be exceeded.

### 3.03 GENERAL

- A. Unless otherwise specified, conform to ACI 304, 305, and 306 for concrete installation requirements such as preparation, mixing, conveying, depositing, curing, and cold and hot weather requirements; consolidate concrete in accordance to ACI 309.
- B. Concrete not placed within 90 minutes or 300 revolutions, whichever occurs first, after the first mixing of the cement and aggregates will be rejected.
- C. Contractor shall indicate on record set of drawings at site, for review prior to installation, a pouring program for concrete work showing unit of operation,

method of pouring, installation of construction/control joints, expansion joints and all necessary work.

- D. Proper grade marker or stakes shall be used by contractor to establish grades for ramps, platforms, sidewalks, slopes to drains, inlets, etc.
- E. Trenches, forms, conveying equipment shall be prepared to receive concrete in accordance to ACI 304.
- F. Place concrete footings upon undistributed clean surfaces, free from frost, ice, mud and water; when foundation is on dry soil or pervious material, lay waterproof sheathing paper over earth surfaces to receive concrete.
- G. Rock surfaces upon which concrete is to be placed, make level, clean, free from all objectionable coatings, water, mud, debris, loose semi-detached or unsound fragments; level surfaces to receive sand cushion placed to minimum thickness of 2 inches.
- H. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperature and mechanical injury; maintain with minimum moisture loss and relatively constant temperature for the period necessary for hydration of the cement and hardening of the concrete.
- I. All freshly cast concrete shall be protected from damaging effects of the elements freezing, rapid drop in temperature and loss of moisture and from future construction operations.

#### 3.04 PREPARATION OF EQUIPMENT AND PLACE OF DEPOSIT

- A. Before placement, clean equipment for mixing and transporting the concrete; remove debris and ice from all surfaces upon which concrete is placed; clean reinforcement of dirt, loose rust, and mill scale, or other coatings.
- B. Remove water from all areas before depositing concrete; before depositing new concrete on or against concrete that has set, thoroughly roughen; clean existing surfaces of laitance, foreign matter or loose particles; retighten forms; slush existing surfaces with neat cement grout coat; place new concrete before grout has attained initial set; give horizontal construction joints grout brush coat of cement, fine aggregate, in same proportions as concrete to be placed.
- C. Thoroughly wet the stone base on which slabs are to be placed where no vapor barrier is indicated.
- D. Check compaction of fill and proper grade for slabs-on-grade. Check screeds and exercise care to prevent disturbing screeds during placement. Provide for construction joints in slabs-on-grade at 20 feet maximum in each direction unless shown otherwise on the contract drawings. Place expansion joint material at junctures of slabs-on-grade with vertical walls and as otherwise shown.

- E. Remove debris, excess form oil, and water from formwork; avoid washing newly deposited concrete.

### 3.05 MIXING

- A. Ready-mixed concrete shall be mixed and delivered in accordance to ASTM C94 and ACI 304. The production facilities shall comply with the requirements of the National Ready Mixed Concrete Association Certification Plan as regards materials storage and handling, batching equipment, central mixer, truck mixers, agitators, non-agitating units, ticketing system, etc.
- B. Do not over-mix; do not use concrete which is retained in mixers so long as to require additional water in excess of design mix water to permit satisfactory placing; retempering of mix is not permitted.
- C. Concrete shall be delivered to the site of the work and the mixed concrete discharged completely within 1-1/2 hours after water has been added to cement. In hot weather, or under conditions contributing to quick stiffening of concrete, this time may be reduced by the engineer.
- D. Concrete delivered shall arrive at the site having a temperature not less than 50 Degrees F nor greater than 85 Degrees F, unless otherwise permitted by the engineer.

### 3.06 CONVEYING

- A. Convey concrete from the mixer to the final deposit by methods that will prevent segregation or loss of materials.
- B. Use of aluminum conveyances is not permitted.

### 3.07 CONCRETE PLACEMENT

- A. Place concrete, including drops greater than 60 inches using recommended practices in accordance to ACI 304 and ACI 318. Once pouring operation commences, it shall be carried out as a continuous operation until a section is completed.
- B. Deposit concrete as nearly as practical in its final position to avoid segregation due to rehandling or flowing; do not use vibrators to move concrete horizontally within the forms.
- C. Do not use retempered concrete or concrete contaminated by foreign material.
- D. Plan and conduct concrete placement to ensure that the concrete is kept plastic and that the concrete is free of cold joints.

- E. Where there is a time delay greater than 45-minutes between adjacent concrete placement, a bulkhead construction joint, complete with waterstops where required, must be installed.
- F. Do not commence placing when the sun, heat, wind or limitations of facilities provided prevent proper finishing or curing.
- G. Discontinue concreting when the descending natural air temperature falls lower than 40 Degrees Fahrenheit unless preparations are made and in place to heat or insulate concrete in accordance to the cold weather concreting requirements of this specification.
- H. Concrete for walls shall be deposited in approximately horizontal layers not to exceed 18 inches in height to avoid segregation due to rehandling and flowing.
- I. Concrete shall not be placed or poured in water. Water level shall be removed or lowered in a manner approved by engineer. Excess water shall not be permitted. Powdering a mixture of cement to absorb excess water shall not be permitted.
- J. Concrete shall be placed before initial set has occurred. Placing should be carried on in such manner that the concrete in the form is still plastic and can be integrated with fresh concrete.
- K. Contractor shall notify engineer of concrete pouring schedule one day in advance of pour to allow for inspection of reinforcing and forms.
- L. Bottom dump buckets may be used for transporting mixed concrete to the desired location. Particular care shall be taken to avoid jarring or bumping as this may cause segregation.
- M. Where chutes are used to transport concrete, they shall be of metal or wood with metal lining and should have a slope not exceeding 1 vertical to 2 horizontal and not less than 1 vertical to 3 horizontal so that the concrete will travel fast enough to keep the chute clean but slow enough to avoid segregation of materials. The end of each chute shall be provided with a baffle to help prevent segregation, or the concrete should be discharged through a tremie or elephant trunk directly into the form.
- N. Elephant trunks and/or tremies shall be used in walls and columns to prevent free fall of the concrete and to allow the concrete to be placed through the cage of reinforcing steel.
- O. Pumping equipment shall be of suitable type, without Y-sections, and with adequate pumping capacity. Loss of slump in pumping shall not exceed 1-1/2 inches.

### 3.08 CONSOLIDATION

- A. Each concrete layer placed shall be compacted by mechanical internal vibrating equipment supplemented by hand spading, rodding, or tamping.
- B. The period of concrete vibration shall not be less than two seconds nor more than five seconds at any one point.
- C. Consolidate concrete thoroughly as it is placed in order to secure a dense mass; work concrete well around the reinforcement and embedded items and into the corners of the forms.
- D. Use internal vibrators inserted vertically over the entire area of the placement; form vibrators not permitted; internal vibrators shall maintain a minimum of 5000 impulses when submerged in concrete.
- E. Vibrate until voids are eliminated, coarse aggregate is suspended in mortar, and entrapped air bubbles begin to rise to the surface; concrete should move back into the space vacated by the vibrator; vibration duration shall be limited only to the time necessary to produce consolidation without causing segregation.
- F. Space vibrator insertions such that the area visibly affected by the vibrator overlaps the adjacent just-vibrated area by a few inches.
- G. Penetrate at least 6 inches into previously placed layers in order to bond between layers and avoid cold joints.
- H. Take care not to over-vibrate air entrained concrete; place vibrator to eliminate honeycombing but avoid excess vibrating that bleeds all entrapped air from the mix.
- I. Do not use vibrators to transport concrete.

### 3.09 JOINTS AND KEYWAYS

- A. Construct expansion, control, and isolation joints and keyways only where indicated on the drawings or at additional locations approved by the engineer (and as shown on the Standard Details).
- B. Where the placing of concrete is discontinued, clean off laitance and other objectionable material to a sufficient depth to expose sound concrete as soon as concrete is firm enough to retain its form; smooth the top surface of concrete adjacent to the forms with a trowel to minimize visible joints on exposed faces.
- C. Immediately upon completion of the work of placing concrete, remove accumulations splashed upon the reinforcement and the surfaces of the forms; perform this removal before concrete takes its initial set; clean reinforcing steel carefully to prevent damage to the concrete steel bond.



- D. Do not halt work within 18 inches of the top of any face.
- E. For bonded horizontal joint construction, roughen the surface and expose the aggregate; clean the surface thoroughly by wet sandblasting, by cutting with high-pressure water jet or by other approved methods; perform cleaning after the concrete has hardened to prevent raveling of the surface below the desired depth.
- F. Before bonding concrete is placed, clean the surface of loose or soft particles or other objectionable materials and keep wet for a minimum period of 12 hours.
- G. Cover the cleaned and saturated surface with a coating of neat cement grout and deposit new concrete before the grout has attained its initial set.

### 3.10 CONCRETE TESTING

- A. Testing for Acceptance
  - 1. Samples of concrete shall be delivered to a location on the site where material conformance tests can be performed.
    - a. Samples of concrete shall be obtained in accordance to ASTM C172.
    - b. Test specimens shall be stored without being disturbed for the first 24 hours.
    - c. Contractor's Sampling and Testing. The contractor, or independent testing laboratory engaged and paid for by the contractor, as approved by the engineer, shall conduct tests on the proposed concrete mixture to determine the slump, entrained air content, compressive strength, or other appropriate tests to determine conformance with these specifications. The contractor shall supply the standard equipment and molds necessary, and the contractor shall transport the test specimens to the testing laboratory.
    - d. Owner's Sampling and Testing. The owner may conduct tests on the proposed concrete mixture to determine the slump, entrained air content, compressive strength, or other appropriate tests to determine conformance with these specifications, as deemed necessary by the engineer.
  - 2. Slump and Air Content Tests.
    - a. Slump tests shall be made in accordance to ASTM C143. Air content tests shall be made in accordance to ASTM C173 or ASTM C231. Slump tests and air tests shall always be performed from the same batch from which strength tests are performed.
    - b. If the measured slump or air content falls outside the limits specified, a check test shall be made immediately on another portion of the same sample. In the event of a second failure, the concrete shall be considered to have failed to meet the requirements of the specifications and shall not be used in the work.

3. Strength Tests (Contractor's Sampling and Testing for Acceptance). Results from tests conducted by the contractor shall be considered evidence of compliance of contractor's materials used in the work, when strength is used as the basis for acceptance.
    - a. Cylinders for strength tests shall be made in accordance to ASTM C31. During the first 24 hours all test specimens shall be covered and kept at air temperatures between 60 Degrees Fahrenheit and 80 Degrees Fahrenheit in facilities provided on the job site by the contractor. At the end of 24 hours, specimens will be carefully transported by the contractor to the testing laboratory, where molds shall be removed, and cylinders shall be cured in a moist condition at 73.4 Degrees Fahrenheit  $\pm$ 3.0 Degrees Fahrenheit until time of test.
    - b. A strength test for any class of concrete shall consist of four standard cylinders made from a composite sample secured from a single load of concrete in accordance to ASTM C172, with one cylinder tested at 7 days, two at 28 days, and the fourth used as a spare. The test results at 28 days shall be the average of the strength of two specimens determined in accordance to ASTM C39, except that if one specimen in a test shows manifest evidence of improper sampling, molding or testing, it shall be disregarded and the spare cylinder shall be tested.
  4. Strength Test (For Early Formwork or Shoring Removal). If the contractor wishes to remove formwork or shoring prior to the minimum time as specified in Structural Cast-In-Place Concrete Forming - Division 03, they shall, at their expense, prepare test cylinders as evidence of concrete strength as follows:
    - a. Cylinders shall be made in accordance to ASTM C31. During the period of time from completion of the pour to removal of protective cover and stripping of forms, all test specimens shall be kept with the pour and be subjected to ambient conditions resulting from the curing and protection facilities provided on the job site by the contractor. At the end of this period, specimens will be carefully transported by the contractor to the testing laboratory, where molds shall be removed and cylinders shall be stored in outdoor ambient conditions to simulate on job site conditions until time of test.
    - b. A minimum of two cylinders made from a composite sample secured from a single load of concrete in accordance to ASTM C172. The test results shall be the average of the strength of two specimens determined in accordance to ASTM C39, except that if one specimen in a test shows manifest evidence of improper sampling, molding or testing, it shall be disregarded.
- B. Selection of Testing Laboratory: An independent testing laboratory to perform Concrete Quality Control shall meet the requirements of ASTM E329. The laboratory shall be selected by the contractor as approved by the engineer.

- C. Test Reports: Test reports will be directly distributed by the laboratory as follows: The original to the contractor; two copies to the engineer; one copy to the owner.
- D. Testing Requirements
1. The contractor shall be required to perform one test for each 100 cubic yards of concrete poured, or fraction thereof, for each class of concrete used. Each test shall consist of 4 cylinders; 1 to be tested at 7 days, 2 to be tested at 28 days, and 1 to be a spare.
  2. Compliance testing shall be performed on every single load, or portion thereof, where water addition to the single load, or portion thereof, takes place on site.
  3. A minimum of 1 test shall be performed per day for each class of concrete placed.
- E. Conditions of Compliance and Non-Compliance
1. Compliance of Contractor's Materials Used in the Work: To conform to the requirements of this specification, every 28-day test representing each mix must be equal to or greater than the specified minimum strength without exception. If a specimen shows manifest evidence of improper sampling, molding, or testing, it will be disregarded. Note, however, that the anticipated strength for all mixes is appreciably above the specified minimum strength due to quality required by the water-cement ratio specified.
  2. Non-Compliance of Contractor's Materials Used in the Work:
    - a. When strength is used as the basis for acceptance, should individual tests of the contractor's specimens produce strengths less than 90% of the specified strength ( $f'_c$ ), tests of cores drilled from the area in question may be required in accordance to ASTM C42. Three cores shall be taken for each cylinder test less than 90% of the specified strength ( $f'_c$ ). If the concrete in the structure will be dry under service conditions, the cores shall be air dried (temperature 60 to 80°F, relative humidity less than 60 percent) for 7 days before test and shall be tested dry. If the concrete in the structure will be more than superficially wet under service conditions, the cores shall be immersed in water for at least 48 hours and tested wet.
    - b. Concrete represented by the core tests will be considered structurally adequate and meet the requirements of this specification if the average of the three cores is equal to at least 95 percent of the specified strength ( $f'_c$ ) and if no single core is less than 90 percent of  $f'_c$ . To check testing accuracy, locations represented by erratic core strengths may be retested. If these strength acceptance criteria are not met by the core tests, the engineer shall order appropriate action at no additional cost to the owner.

### 3.11 CURING

- A. Concrete shall be wet cured by immersion of moisture-retaining covers in conformance with ACI 308 or shall receive curing compound in accordance to ACI 309.
- B. All floors to receive epoxy finish shall be wet cured. Cover exposed surfaces with a saturated material (burlap or cotton mats) and keep wet continuously with a soil soaker hose for 7 curing days for all concrete except high early strength concrete; leave covering in place, without wetting, for an additional 3 days.
- C. A curing day is defined as 24-hour day when the concrete surfaces are kept moist and the uniform temperature of the concrete mass is between 55 Degrees Fahrenheit and 75 Degrees Fahrenheit.
- D. Curing shall start as soon as free surface water disappears after finishing. Where forms are not removed immediately, curing shall be accomplished in a manner acceptable to the engineer.
- E. Curing compounds may not be used on surfaces that are to receive epoxy finish.
- F. Vertical Surfaces: When the forms are removed entirely, spray the surface with water and allow it to reach a uniformly damp appearance with no free water on the surface; apply curing compound or begin water curing.
- G. For curing concrete under hot weather conditions, see Hot Weather Requirements in this section.
- H. For curing concrete under cold weather conditions, see Cold Weather Requirements in this section.

### 3.12 CONCRETE WALL FINISHES

- A. Complete screeding and darbying of top of walls before excess moisture or bleeding water is present on the surface.
- B. Do not begin subsequent finishing operations until surface water has disappeared.
- C. Refer to Concrete Schedule, included in this specification section, for finish type at each location, defined as follows:
  - 1. Rough Form Finish: (Type W1)
    - a. No form facing materials specified.
    - b. Patch tie holes and defects.
    - c. Chip off fins 1/4 inch or more in height.
  - 2. Smooth Form Finish: (Type W2)
    - a. Use a form facing material that will produce a smooth, hard, uniform texture on the concrete.
    - b. Keep seams to a practical minimum.

- c. Patch tie holes and defects.
  - d. Remove all fins.
- 3. Smooth Rubbed Finish: (Type W3)
  - a. Produce a Smooth Form Finish.
  - b. Wet surface and rub with a Carborundum brick until uniform color and texture are produced.
  - c. Perform rubbing no later than 24 hours after forms are removed.
  - d. Do not use any cement grout other than the paste drawn from the concrete itself by rubbing.
  - e. Thoroughly wash the surface with water.
- 4. Smooth Troweled Finish: (Type W4)
  - a. Produce a Smooth Rubbed Finish.
  - b. After wet-rubbing, finish with a steel trowel to increase compaction of fines and to provide maximum density.
- 5. Smooth Finish (Grout Cleaned): (Type W5)
  - a. Use for architectural surfaces exposed to general view, unless other indicated.
  - b. Mix 1 part portland cement and 1-1/2 parts fine sand with sufficient water to produce grout having consistency of thick paint; use white portland cement in combination with normal portland cement to achieve uniform surface color after drying.
  - c. Wet surface of concrete and uniformly apply grout with brush or spray gun completely filling air bubbles; surface with a wood float scouring wall vigorously.
  - d. Allow grout to partially set for one to two hours, depending on weather conditions; in hot dry weather, keep damp, using fine fog spray.
  - e. When grout has hardened sufficiently to be scraped from wall with edge of steel trowel without removing grout from small air holes, cut off all grout that can be removed with trowel.
  - f. Allow surface to dry thoroughly then rub vigorously with dry burlap to completely remove dried grout; there shall be no visible film or grout remaining after this rubbing.
  - g. The entire cleaning operation for any area must be completed the day it is started; no grout shall be left on overnight, and sufficient time shall be allowed for grout to dry after it has been cut with trowel so it can be wiped off clean with burlap.
  - h. After entire surface has been grout cleaned, wipe off any slightly dark spots or streaks with fine abrasive hone.
- 6. Sand Blast Finish: (Type W6)
  - a. Sand-blast the concrete surface to a degree sufficient to expose aggregates. Protect adjacent materials and inserts during abrasive blasting operations.
  - b. Degree of blasting shall be light and shall expose fine aggregates with occasional exposure of course aggregate, to produce a uniform color, and not exceed a reveal of 1/16-inch.

### 3.13 CONCRETE SLAB FINISHING

- A. Complete screeding and darbying slabs before excess moisture or bleeding water is present on the surface.
- B. Do not begin subsequent finishing operations until surface water has disappeared and the concrete will sustain foot pressure with only approximately 1/4 inch indentation.
- C. Refer to Concrete Schedule, included in this specification section, for finish type at each location, defined as follows:
  - 1. Smooth Float Finish: (Type S1)
    - a. Consolidate concrete with a power-driven disc-type float or a combination floating-troweling machine with metal float shoes attached.
    - b. Machines which have a water attachment for wetting the concrete during the finishing operation are prohibited.
    - c. Check and level surface plane to a tolerance not exceeding 1/4 inch in 10 feet when tested with a 10-foot straightedge. Cut down high spots and fill low spots; immediately after re-leveling, refloat surface to a uniform, smooth, granular texture.
    - d. Where slab drainage is indicated, take care to maintain accurate slopes for drainage.
  - 2. Steel Troweled Finish: (Type S2)
    - a. Produce a Smooth Float Finish.
    - b. After float finishing, steel trowel surface as specified in Concrete Schedule to increase the compaction of fines and to provide maximum density and wear resistance.
    - c. Steel Troweled Finish: Screed and bull float or darby. Give preliminary float finish, true, even and free from depressions; float surface with hand or machine floats; compact surface with not less than 2 thorough and complete steel troweling operations.
    - d. Tolerance on finished steel troweled floors in no instance shall exceed 1/8 inch in 10'-0" on surface; where floor drains occur, slope floors to drains.
    - e. Buffing: After concrete floors have been properly cured, buff thoroughly to remove soluble salt incrustation or other foreign substances.
  - 3. Broom Finish: (Type S4)
    - a. Draw stiff broom over previous Smooth Float Finish, to obtain non-slip finish.

### 3.14 PERIMETER INSULATION

- A. Install perimeter insulation at building foundation wall and under floor slab as shown on the contract drawings.

### 3.15 HOT WEATHER REQUIREMENTS

- A. Comply with ACI 305R unless otherwise specified herein below.
- B. Hot weather conditions are deemed to exist when the temperature in the forms is 75 Degrees Fahrenheit or above, or a combination of high air temperature, low relative humidity and wind velocity impair the quality of fresh or hardened concrete; take protective measures for mixing, transporting and placing concrete in accordance to ACI 305R.
- C. The temperature of the concrete at the place of discharge may not exceed 85 Degrees Fahrenheit.
  - 1. If ice is used to lower temperature, place crushed, shaved or chipped ice directly into the mixer as part or all of the mixing water; mix until ice is completely melted.
  - 2. Record the concrete temperature at the time of discharge.
- D. Do not add water that will cause the proportions to exceed the maximum water-cement ratio shown in Table I.
  - 1. Notify the engineer before adding any water to the concrete mix.
  - 2. Record the amount of water added to the concrete at the jobsite.
- E. Discharge concrete within 45 minutes or 100 revolutions, whichever occurs first, after the first mixing of cement and aggregates.
- F. Placing and Curing:
  - 1. Place concrete promptly upon arrival.
  - 2. Provide at least one standby vibrator for each 3 vibrators in use.
  - 3. Protect concrete from direct sunlight; keep forms covered and moist by means of water sprinkling or the application of continuously wetted burlap or cotton mats for a minimum of 24 hours. Windbreaks and/or sunshades shall be provided as directed by the engineer.
  - 4. When forms are removed, provide wet cover to the newly exposed surfaces to avoid exposure to hot sun and wind.
  - 5. Continue specified water curing methods for 10 days; leave covering in place 4 additional days; do not permit alternate wetting and drying cycles.
  - 6. For slabs on grade, beam and deck concrete, and other horizontal placements protect the surface between finishing operations using one or more of the following methods:
    - a. Careful use of a fog nozzle.
    - b. Spreading and removing polyethylene sheeting between finishing operations.
    - c. Application of mono-molecular film after the strike-off.
- G. During extremes in weather, floor slabs shall not be cast unless the slab is protected by a roof and other suitable protective measures are provided. After curing has

been completed, the floor shall be exposed to the air for 48 hours prior to allowing traffic on the floors.

### 3.16 COLD WEATHER REQUIREMENTS

- A. Comply with ACI 306.1 (R2002) unless otherwise specified herein below.
- B. Cold weather is defined any time when the daily temperature is 40 Degrees Fahrenheit or lower during placement and the protection period. If at any time during the progress of the work, the temperature drops below 40 Degrees F., the contractor shall make suitable provisions to protect the concrete by use of insulation materials such as blankets, mats, etc., and equipment for providing artificial heat.
- C. Combustion type temporary heating devices shall be vented outside of any temporary enclosure and building envelope. Combustion gases shall not be allowed in any temporary enclosure and building envelope.
- D. Protect concrete surfaces from freezing for at least 24 hours after placement.
- E. All surfaces in contact with newly-placed concrete including formwork, reinforcement and subgrade must be above 35 Degrees Fahrenheit.
- F. Use preparation methods capable of producing concrete with a temperature not more than 85 Degrees Fahrenheit, and not less than 55 Degrees Fahrenheit, at the time of placement.
- G. Do not heat concrete ingredients to a temperature higher than that necessary to keep the temperature of the mixed concrete, as placed, within the specified temperatures. (Do not heat water in excess of 140 Degrees Fahrenheit.)
- H. Concrete shall have a temperature of not less than 55 Degrees Fahrenheit when placed; mix concrete at a temperature between:
  - 1. 60 Degrees Fahrenheit and 70 Degrees Fahrenheit when outside air temperature is above 30 Degrees Fahrenheit.
  - 2. 65 Degrees Fahrenheit and 75 Degrees Fahrenheit when outside air temperature is between 0 Degrees Fahrenheit and 30 Degrees Fahrenheit.
  - 3. 70 Degrees Fahrenheit and 80 Degrees Fahrenheit when outside air temperature is below 0 Degrees Fahrenheit.
- I. Follow concrete placement with tarpaulins or other readily movable coverings, so only a few feet of concrete is exposed to the outside air at any time.
- J. Maintain the temperature and moisture conditions specified in all parts of the newly placed concrete by covering, insulating, housing or heating; arrange for protection methods in advance of placement.



- K. Maintain concrete at a temperature of not less than 55 Degrees Fahrenheit nor more than 70 Degrees Fahrenheit for a period of 3 days after placement.
- L. A thermometer accurate to plus or minus 2 Degrees F shall be placed under the curing blanket. Additional insulation shall be supplied as required to maintain the temperature above 55 Degrees F.
- M. After the curing period, the temperature of the exposed surface shall not be permitted to drop faster than 30 Degrees F in 24 hours.
- N. Do not remove forms during the initial protection period.
- O. Protect insulation against wetting that will impair its insulating value using moisture-proof cover material; keep insulation in close contact with concrete.
- P. Construct enclosure to withstand wind and snow loads and be reasonably airtight; provide sufficient space between the concrete and enclosure to permit free circulation of heated air.
- Q. Use vented heaters; do not permit heaters to heat or dry concrete locally. Unvented salamanders or other heaters which produce carbon dioxide as by-products shall not be permitted within enclosures or inside buildings. If heaters are used, precautions shall be taken to prevent drying of the slab through the use of water jackets or other suitable methods.
- R. Maintain relative humidity above 40% within heated enclosures before construction supports are removed.
- S. Monitor temperature to ensure concrete is kept within specified limits recording time and concrete temperature every 8 hours.
- T. Assure concrete has developed necessary strength before removing forms; provide additional test cylinders with the same protection as the structure they represent to verify concrete strength before construction supports are removed.
- U. If water curing is used, terminate at least 12-hours before end of temperature protection period. Permit concrete to dry.
- V. After the required protection period gradually reduce the concrete temperature within an enclosure or insulation at a rate not to exceed 20 Degrees Fahrenheit per day until the outside temperature has been reached.
- W. Apply membrane forming curing compound to concrete surfaces during the first period of above-freezing temperatures after forms are stripped and before air temperature rises to 50 Degrees Fahrenheit; apply membrane forming curing compound to slabs as soon as finishing operations are completed, except where live steam curing is used.

### 3.17 DELIVERY TICKETS

- A. With each load of concrete delivered to the job there shall be furnished by the ready-mixed concrete producer duplicate delivery tickets, one for the contractor and one for the engineer. Delivery tickets shall provide the following information:
1. Date and serial number of ticket;
  2. Name of ready-mixed concrete plant;
  3. Job location;
  4. Contractor;
  5. Type and brand name of cement;
  6. Mix number or specified cement content in bags per cubic yard of concrete;
  7. Truck number;
  8. Time dispatched stamped by a time clock;
  9. Amount of concrete in load in cubic yards;
  10. Admixtures in concrete, if any;
  11. Maximum size of aggregate;
  12. Water added at job, if any;
  13. Slump of concrete ordered

**TABLE 1**  
**CONCRETE CLASS SCHEDULE**

Parameter Value	Compressive Strength (PSI) 28-Day	Water- Cement Ratio Maximum	Air Content Range (%) Minimum- Maximum	Slump Range (Inches) Minimum- Maximum	Coarse Aggregate (Inches) Maximum
Class A	4,000	0.5	1 to 2	2 to 4	3/4
Class B	4,000	0.5	1 to 2	2 to 4	1-1/2
Class C	4,000	0.5	5 to 7	2 to 4	3/4
Class D	4,000	0.5	4 to 6	2 to 4	1-1/2

**TABLE 2**  
**CONCRETE SCHEDULE**  
**USES AND PROPERTIES**

Use	Finish	Class and Considerations
<b>Structural</b>		
Foundations and footings, (non-exposed)	W1	Class A
	W1	Class B
Exposed foundations	S2 Top, W2 Sides	Class A
	S2 Top, W2 Sides	Class B
Slabs and floors, (Exterior)	S4	Class C
	S4	Class D
Slabs and floors, (Interior)	S2	Class A
	S2	Class B
Columns, posts	W6	Class C
	W6	Class D

END OF SECTION

## DIVISION 4 - MASONRY

### SECTION 04100

#### MORTAR AND MASONRY GROUT

##### PART 1 GENERAL

###### 1.01 SECTION INCLUDES

- A. Mortar and grout for masonry.

###### 1.02 WORK FURNISHED BUT INSTALLED UNDER OTHER SECTIONS

- A. Section 04300 - Unit Masonry System: Installation of mortar and grout.

###### 1.03 RELATED SECTIONS

- A. Section 04300 - Unit Masonry System: Mortar and grout for block.
- B. Section 08112 - Standard Steel Frames: Grout for steel door frames.

###### 1.04 REFERENCES

- A. American Society for Testing and Materials:
  - 1. ASTM C5 - Standard Specification for Quicklime for Structural Purposes.
  - 2. ASTM C94 - Standard Specification for Ready-Mixed Concrete.
  - 3. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.
  - 4. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.
  - 5. ASTM C150 - Standard Specification for Portland Cement.
  - 6. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.
  - 7. ASTM C270 - Standard Specification for Mortar for Unit Masonry.
  - 8. ASTM C387 - Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete.
  - 9. ASTM C404 - Standard Specification for Aggregates for Masonry Grout.
  - 10. ASTM C476 - Standard Specification for Grout for Masonry.
  - 11. ASTM C595 - Standard Specification for Blended Hydraulic Cement.
  - 12. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
  - 13. ASTM C1019 - Standard Test Method for Sampling and Testing Grout.
  - 14. ASTM C1072 - Method for Measurement of Masonry Flexural Bond Strength.
  - 15. ASTM C1142 - Standard Specification for Extended Life Mortar for Unit Masonry.
  - 16. ASTM C1314 - Standard Test Method for Constructing and Testing Masonry Prisms Used to Determine Compliance with Specified Compressive Strength of Masonry.

17. ASTM C1329 - Standard Specification for Mortar Cement.
  18. ASTM C1357 - Standard Test Method for Evaluating Masonry Bond Strength.
  19. ASTM E447 - Test Methods for Compressive Strength of Masonry Prisms.
  20. ASTM E518 - Test Method for Flexural Bond Strength of Masonry.
- B. International Masonry Industry All-Weather Council:
1. IMIAC – Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.
- C. The Masonry Society:
1. TMS MSJC - Building Code for Masonry Structures (ACI 530/ASCE 5/TMS 402), Specification for Masonry Structures (ACI 530.1/ASCE 6/TMS 602) and Commentaries.
- D. International Building Code, 2009 Edition, and referenced standards with State of Wisconsin amendments.

#### 1.05 SUBMITTALS

- A. Submit product data on cement, lime, and mortar color to be used.
- B. Samples: Submit one sample of mortar, illustrating mortar color and color range.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Maintain packaged materials clean, dry, and protected against dampness, freezing, and foreign matter.

#### 1.07 ENVIRONMENTAL REQUIREMENTS

- A. Cold Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.
- B. Maintain materials and surrounding air temperature to maximum 90 degrees F (32 degrees C) prior to, during, and 48 hours after completion of masonry work.

### PART 2 PRODUCTS

#### 2.01 MATERIALS

- A. Portland Cement: ASTM C150, Type I, gray color.
- B. Mortar Aggregate: ASTM C144, standard masonry type.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Grout Course Aggregate: ASTM C404.

- E. Water: Clean and potable.
- F. Masonry cement not permitted.
- G. Premixed Portland and Lime: Western or Rockwell complying with ASTM C270.
- H. Premixed Portland and Lime: Sand by Silomix or Quikcrete complying with ASTM C270.

## 2.02 MORTAR COLOR

- A. Mortar for the Decorative Concrete Units shall be colored. Premeasured by SGS or DCS. Color as selected from manufacturer's standard colors shall be color matched to adjacent block color.
- B. All other mortar shall be standard gray.

## 2.03 ADMIXTURES

- A. Water Repellent: Dry-Block by Grace Construction Products, Rheomix Rheopel by BASF, or equal. Shall be compatible with the water repellent used in the concrete masonry units. For use in the exterior veneer mortar joints only.

## 2.04 MORTAR MIXING

- A. Thoroughly mix portland cement-lime mortar ingredients in accordance to ASTM C270 proportion specification as listed below.

### **Proportion Specification Requirements**

Proportions by Volume (Cementitious Materials)

Mortar type	Portland Cement	Hydrated Lime	Aggregate Ratio (Measured in Damp, Loose Conditions)
S	1	over 1/4 to 1/2	Not less than 2-1/4 and not more than 3 times the sum of the separate volumes of cementitious materials.
N	1	over 1/2 to 1-1/4	Not less than 2-1/4 and not more than 3 times the sum of the separate volumes of cementitious materials.

- B. Schedule: Mix the mortar in accordance to the types scheduled below:  
Concrete masonry: Type N
- C. Maintain sand uniformly damp immediately before the mixing process.
- D. Add mortar color and water repellent in accordance to manufacturer's instructions. Provide uniformity of mix and coloration.

- E. Do not use anti-freeze compounds to lower the freezing point of mortar.
- F. If water is lost by evaporation, re-temper only within two hours of mixing.
- G. Use mortar within 2 hours after mixing at temperatures of 90 degrees F, or two-and-one-half (22) hours at temperatures under 40 degrees F.

## 2.05 GROUT MIXES

- A. Bond Beams and Lintels: 3,000 psi strength at 28 days; 8-10 inches slump; premixed type in accordance to ASTM C94 or mixed in accordance to ASTM C476 course grout.
- B. Engineered Masonry: 3,000 psi strength at 28 days; 8-10 inches slump; premixed type in accordance to ASTM C94 or mixed in accordance to ASTM C476 course grout.

## 2.06 GROUT MIXING

- A. Thoroughly mix grout ingredients in quantities needed for immediate use in accordance to ASTM C476 course grout.
- B. Do not use anti-freeze compounds to lower the freezing point of grout.

# PART 3 EXECUTION

## 3.01 INSTALLATION

- A. Install mortar and grout to requirements of the specific masonry sections.
- B. Work grout into masonry cores and cavities to eliminate voids.
- C. Do not install grout in lifts greater than 12 inches without consolidating grout by rodding.
- D. Do not displace reinforcement while placing grout.
- E. Remove excess mortar from grout spaces.

END OF SECTION

## SECTION 04300

### UNIT MASONRY

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Concrete Masonry Units.
- B. Cut Limestone Window Sills.
- C. Reinforcement, Anchorage, and Accessories.
- D. Masonry Cleaning.

##### 1.02 WORK INSTALLED BUT FURNISHED UNDER OTHER SECTIONS

- A. Section 03200 - Concrete Reinforcement: Reinforcing bars.
- B. Section 04100 - Mortar and Masonry Grout: Mortar and grout.
- C. Section 05500 - Metal Fabrications: Loose steel lintels and supports.
- D. Section 07212 - Board Insulation: Insulation for cavity spaces.
- E. Section 08112 – Standard Steel Frames: Steel frames and anchors.
- F. Built-in Items Furnished by Other Sections.

##### 1.03 REFERENCES

- A. American Society of Civil Engineers (ACI) International:
  - 1. ACI 530/530.1- Building Code Requirements and Specification for Masonry Structures and Related Commentaries.
- B. American Society for Testing and Materials (ASTM) International:
  - 1. ASTM A580 - Standard Specification for Stainless Steel Wire.
  - 2. ASTM A951 - Standard Specification for Steel Wire for Masonry Joint Reinforcement.
  - 3. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units.
  - 4. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units.
  - 5. ASTM C140 - Standard Test Methods of Sampling and Testing Concrete Masonry Units and Related Units.
  - 6. ASTM C568 – Standard Specification for Limestone Dimension Stone.



- C. Indiana Limestone Institute of America (ILI):
  - 1. ILI Handbook
  - 2. Specifications for Cut Indiana Limestone.
- D. International Code Council:
  - 1. IBC - International Building Code, 2009 Edition, and referenced standards with 2011 State of Wisconsin amendments.
  - 2. IECC - International Energy Conservation Code, 2009 Edition, and referenced standards with 2011 State of Wisconsin amendments.
- E. The Masonry Society (TMS):
  - 1. TMS MSJC - Building Code for Masonry Structures (ACI 530/ASCE 5/TMS 402), Specification for Masonry Structures (ACI 530.1/ASCE 6/TMS 602) and Commentaries.
- F. National Concrete Masonry Association:
  - 1. TEK Manual for Concrete Masonry Design and Construction.

#### 1.04 SUBMITTALS

- A. Product Data: Submit on all accessories and reinforcement.
- B. Test Data: Submit on concrete masonry units.
- C. Samples:
  - 1. Submit samples of decorative block to illustrate color, texture, and extremities of color range.
  - 2. Submit 6-inch by 6-inch sample for color selection, minimum gray and cream.

#### 1.05 QUALITY ASSURANCE

- A. Perform Work in accordance to TMS MSJC Code and TMS MSJC Specification.

#### 1.06 QUALIFICATIONS

- A. Stone Supplier: Company specializing in quarrying cut stone with 10 years of experience.
- B. Installer: Company specializing in performing Work of this section with minimum three (3) years documented experience.

#### 1.07 MOCK-UP

- A. A 2-foot long by 4-foot 0 inch tall mock-up shall be constructed. The mock-up shall be constructed as a freestanding unit on the construction site and shall not be part of the building. Pour a 16-inch wide by 6 inch thick by 8 foot long concrete footing on which to construct the mock-up. The mock shall consist of the

decorative block and block cavity wall construction including the flashing, mortar, block, ties, sealant, weeps, control joint, and insulation. The units shall be cleaned. If the mock-up is not constructed in accordance to the plans and specifications and to the acceptance of the owner and Architect, it shall be rebuilt at no cost to the owner. The mock-up when complete and accepted will be used as a measure of quality and performance for the work to be built. The mock-up shall remain until work of this section is completed. Demolish and remove the mock-up from the site after work of this section is complete.

#### 1.08 PRE-INSTALLATION MEETINGS

- A. A pre-construction conference shall be conducted by the Architect prior to commencing work of this section.
- B. Convene minimum one week prior to commencing work of this section.
- C. The Engineer/Architect, general contractor on-site foreman, the on-site mason foreman, and the mason project manager must be in attendance at this meeting.
- D. Review conditions of installation, installation procedures, and coordination required with related work.
- E. All submittals must be submitted for all items and must have been accepted prior to this meeting.
- F. No masonry work shall begin on site until after this meeting occurs.

#### 1.09 DELIVERY, STORAGE, AND HANDLING

- A. Concrete block and other materials stored on-site must be stored off the ground and be covered with plastic to prevent the material from becoming wet or covered with ice and snow. The material shall remain covered until it is used.
- B. Protect stone from visible discoloration.
- C. All stone shall be received and unloaded at the site with necessary care in handling to avoid damaging or coiling. Chemically treated wood should not be used. DO NOT use chestnut, walnut, oak, fir, and other woods containing tannin.
- D. Stone shall be stored clear of the ground on non-staining skids (cypress, white pine, poplar, or yellow pine without an excessive amount of resin).
- E. Stone shall be covered with waterproof paper, clean canvas, or polyethylene.

#### 1.10 ENVIRONMENTAL REQUIREMENTS

- A. Hot and Cold Weather Requirements: International Building Code and The Masonry Society ACI 530.

## 1.11 COLD WEATHER PROTECTION

- A. Temporary enclosures shall be constructed around the areas of work.
- B. Combustion type temporary heating devices shall be vented outside of any temporary enclosure and building envelope. Combustion gases shall not be allowed in any temporary enclosure and building envelope.

## 1.12 COORDINATION

- A. Coordinate masonry work with installation of window and door anchors.

## PART 2 PRODUCTS

### 2.01 CONCRETE MASONRY UNITS

- A. Hollow Loadbearing Block Units: ASTM C90, Grade N, Type II, normal weight, 3275 psi minimum compressive strength on the net area.
- B. Nonloadbearing Units: ASTM C129, Type II, hollow, normal weight, 3275 psi minimum compressive strength on the net area.
- C. Masonry Units: Modular sized to thickness as indicated on drawings; provide special units for 90-degree corners, bond beams, sash units, end units, lintels, etc.
- D. Decorative Block Units: ASTM C90, Type II, normal weight, 3275 psi minimum compressive strength on the net area, integral color, integral waterproofing of Dry-Block by Grace Construction Products or Rheomix Rheopel by BASF (product shall be same as provided for mortar).
  - 1. Types:
    - a. Type 'A': Split face.
    - b. Type 'B': Striated texture.
  - 2. Colors, design based on County Materials:
    - a. Color 1: 12-030A Desert Castle
    - b. Color 2: 12-018A Tobacco Road

### 2.02 REINFORCEMENT AND ANCHORAGE

- A. Joint Reinforcement for Single Wythe Interior Walls: Single width, truss-type; ASTM A580 Type 304 stainless steel; cold-drawn steel wire, all 9 gauge wires.
  - 1. #120 Truss-Mesh by Hohmann and Barnard.
  - 2. Series 300 Truss 2 Wire by Wire-Bond.
- B. Joint Reinforcement for Exterior Cavity Walls: Ladder-type with adjustable eye-wire and adjustable wall ties; ASTM A580, type 304 stainless steel; all 9 gauge wires.
  - 1. #270 Ladder-Type by Hohmann and Barnard.
  - 2. Series 800 Level Eye Ladder (Hook & Eye) by Wire-Bond.

- C. Joint Reinforcement for Decorative Block Veneer: Single width, truss-type; ASTM A580 type 304 stainless steel; all 9 gauge wires.
  - 1. #120 Truss-Mesh by Hohmann and Barnard.
  - 2. Series 300 Truss 2 Wire by Wire-Bond.
- D. Wall Strap: ASTM A580 type 304 stainless steel; 1/8 inch bar; 1-1/2 inch wide; 2 inch bends; length so bends are centered in masonry unit cores.
  - 1. #344 Rigid Partition Anchor by Hohmann and Barnard.
  - 2. #140Z Type Stone Anchor by Heckmann.
  - 3. Rigid Steel Tie (#3000Z) by Wire-Bond.
- E. Top of Wall Strap: ASTM A580 Type 304 stainless steel; 12 gauge, bent on both ends, fastener hole in one vertical leg to receive 1/4 inch diameter masonry screw.
- F. Reinforcing Steel: Type as specified in Section 03200.
- G. Rebar Positioner: Mill galvanized, 9 gauge wire.
  - 1. #RB Rebar Positioner by Hohmann and Barnard.
- H. Acceptable Manufacturers:
  - 1. Hohmann & Barnard
  - 2. Heckmann Building Products, Inc.
  - 3. Wire-Bond (formerly Masonry Reinforcing Corp. of America)

## 2.03 MASONRY FLASHINGS

- A. Flashing: Self-sealing, self-healing, fully adhering, composite flexible flashing consisting of 32 mil thick pliable and highly adhesive rubberized asphalt compound bonded completely and integrally to 8 mil thick, high-density, four plies of cross-laminated polyethylene film, overall 40 mil thickness; protected from contamination from dust or dirt by a silicone-coated release sheet, to be removed immediately before installation.
  - 1. Perm-A-Barrier by Grace Construction Products.
  - 2. Or engineer approved equal.
- B. Self-Adhesive Flashing Primer:
  - 1. Perm-A-Barrier WB Primer by Grace Construction Products.
  - 2. Or engineer approved equal.
- C. Drip Edge: Smooth 3-inch wide factory-hemmed type 304 stainless steel 26 gauge flashing drip edge; provide prefabricated outside corner pieces.
  - 1. Drip plate (DP) by Hohmann & Barnard.
  - 2. #4156 Drip Edge Flashing by Wire-Bond.
- D. Termination Bar: Aluminum 1/8-inch thick by 1 inch wide with 1/4-inch holes at 8-inch to 16-inches on center. .
  - 1. T1-Termination Bar by Hohmann & Barnard.
  - 2. #4200 Termination Bars by Wire-Bond.

- E. Fasteners: Powers Fasteners Zamac Nailin stainless steel mushroom head 1/4-inch x 1.25 inch fasteners.

## 2.04 ACCESSORIES

- A. Preformed Control Joints: Extruded rubber, ASTM D-2000 2AA-805, preformed control joint.
1. RS Series Rubber Control Joint by Hohmann and Barnard.
  2. 2901 Rubber Control Joint by Wire Bond.
- B. Building Paper: (as lintel slip plane) 15# asphalt saturated felt.
- C. Expansion Joint Material: Closed cell polyvinyl chloride foam or neoprene sponge, resiliency recovery of 95 percent if not compressed more than 50 percent of original thickness.
1. NS-Closed Cell Neoprene Sponge by Hohmann & Barnard.
  2. Expansion Joint (#3300) by Wire Bond.
  3. Or equal.
- D. Weeps: Polyester with 90% open weave mesh, flame retardant, anti-microbial, 2 5/8-inch by 3 1/2-inch. Color selected by Architect from manufacturer's standard colors.
1. Mortar Net Weep Vents by Mortar Net USA.
  2. CavClear Weep Vents by Cavclear/Archovations.
  3. Or equal.
- E. Mortar Deflector: Polyethylene (HDPE) or nylon woven open mesh with 90% open weave mesh in a dovetail configuration connected by a continuous bottom strip, 10 inch high by 1 inch thick.
1. Mortar Trap by Hohmann & Barnard.
  2. Mortar Net by Mortar Net USA.
  3. #84 Weep-Thru Mortar Deflector by Heckmann.
- F. Drainage Matt: Cavity wall mortar deflection and ventilation system. Woven core of polypropylene. Class A fire rated. Total thickness of 0.80 inch.
1. Mortairvent CW by Advanced Building Products.
- G. Sealant: Tremco Dymonic or BASF Sonolastic NP 1.
- H. Hot-Dip Galvanizing Touch-Up Paint: Yield shall be 93% pure zinc metallic powder; meet ASTM B-117-64 salt spray (2000 hours); meets performance requirements of MIL-D-46105 and DOD-P-21035A.
1. Crown Premium 7007 by Aervoe Industries or equal.

## 2.05 STONE AND ACCESSORIES

- A. Limestone: Cut Indiana Oolitic Limestone, buff color, smooth finish, as quarried in Lawrence, Monroe, and Owen Counties, Indiana.

- B. Setting Buttons: Plastic.
- C. Stone Fabrication:
  - 1. Form external corners to square joint profile.
  - 2. Coat unexposed surface of stone with back coating. Joint surfaces should be coated only to 1 inch of finished surface. Allow coating to cure.
  - 3. All stone shall be cut accurately to shape and dimensions and full to the square. All exposed faces shall be dressed true. Beds and joints shall be at right angles to the face, and joints shall have a uniform thickness of 3/8 inch unless otherwise shown or noted on drawings.
  - 4. Any miscellaneous cutting and drilling of stone necessary to accommodate other trades will be done by the cut stone fabricator. Cutting and fitting, due to job site conditions, will be the responsibility of the general contractor.
  - 5. Incidental cutting such as for window frame clips, etc., which is normally not considered to be the responsibility of the stone supplier, will be provided only by arrangement by the contractor with the stone supplier.

## 2.06 LINTELS AND SUPPORTS

- A. Concrete block bond beams, size and reinforcement as shown.
- B. Steel lintels: Provided under Section 05500.
- C. Stone Supports: Provided under Section 05500.

## 2.07 CLEANING SOLUTION

- A. Masonry: Sure Klean Van Trol or Sure Klean 600 detergent as manufactured by Prosoco, Inc. Provide type of cleaner from those listed and as recommend by brick manufacturer.
- B. Stone: Type which will not harm stone. Consult stone supplier for recommended type.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify field conditions are acceptable and are ready to receive work.
- B. Verify items provided by other sections of work are properly sized and located.
- C. Verify built-in items are in proper location and ready for roughing into masonry work.

### 3.02 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied to other sections.

- B. Establish lines, levels, and coursing. Protect from disturbance.
- C. Furnish temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent support.
- D. When necessary, before setting in the wall, all stones shall be thoroughly cleaned on all exposed surfaces by washing with fiber brush and soap powder, followed by a thorough drenching with clear water.

### 3.03 COURSING

- A. Place masonry to lines and levels indicated.
- B. Maintain masonry courses to uniform dimension. Make vertical and horizontal joints equal and of uniform thickness.
- C. Lay concrete masonry units in running bond for all exposed block walls, unless noted otherwise on drawings. Course one block unit and one mortar joint to equal 8 inches. All mortar joints shall be tooled concave (including concealed joints).

### 3.04 PLACING AND BONDING

- A. Lay masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Buttering corners of joints and deep or excessive furrowing of mortar joints are not permitted.
- C. Remove excess mortar as Work progresses.
- D. Back bevel decorative block when placing in cavity wall.
- E. Fully bond intersections at external and internal corners.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment is required, remove mortar and replace.
- G. Perform job site cutting of masonry units with proper tools to assure straight, clean, unchipped edges. Take care to prevent breaking masonry unit corners or edges.
- H. Cut mortar joints flush where a finished base is scheduled.

### 3.05 CAVITY WALL

- A. Build inner wythe ahead of outer wythe to receive air/vapor retarder system and cavity insulation.
- B. Install steel lintels as provided under Section 05500. Galvanized coating shall be touched up as required.

- C. Install insulation as required in Section 07212 after installation of air/vapor retarder system in Section 07265.
- D. Do not install veneer until air/vapor retarder system of Section 07265 and insulation of Section 07212 are installed.
- E. Install weeps in veneer at 16 inches on center horizontally above through wall flashing at lintels or top of walls and at bottom of walls. Set face of weep back 3/8 inch from face of exterior wall to be flush with face of tooled mortar joint.
- F. Install weep holes in veneer at 16 inches on center horizontally above through wall flashing at stone window sills. A minimum of 2 weeps shall be installed at each sill.
- G. Do not permit mortar to drop or accumulate into cavity air space or to plug weep holes. Back bevel mortar on cavity wall side of decorative block.

### 3.06 TOLERANCES

- A. Variation from Unit to Adjacent Unit: 1/32 inch maximum.
- B. Variation from Plane of Wall: 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.
- C. Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- D. Variation from Level Coursing: 1/8 inch in 3 feet.
- E. Variation of Joint Thickness: 1/8 inch in 3 feet.
- F. Maximum Variation from Cross Sectional Thickness of Walls: Plus or minus 1/4 inch.

### 3.07 REINFORCEMENT AND ANCHORS

- A. Install horizontal joint reinforcement 16 inches on center, unless noted otherwise.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend 16 inches minimum each side of opening.
- C. Lap joint reinforcement ends minimum 6 inches. Extend 16 inches minimum each side of opening.
- D. Do not extend horizontal joint reinforcement across control or expansion joints, unless noted otherwise.
- E. Reinforce all bond beams with two #5 bars placed 1 inch from bottom web, unless noted otherwise.



- F. Place reinforcing bars supported and secured against displacement. Maintain position within 1/2 inch of true dimension. Use rebar positioners to secure vertical reinforcement bars in place.
- G. Vertical reinforcing bars shall be centered in unit core and grouted solid, unless noted otherwise.
- H. At all wall openings: Install one #5 bar vertically in core closest to opening up to bottom of lintel. In next adjacent core, install one #5 bar vertically full height of wall.
- I. At corners: Install one #5 bar vertically in core full height of wall.
- J. At control joints: Install one #5 bar vertically in core adjacent to control joint full height of wall.
- K. Lap reinforcing bars (splice lap lengths) as follows:
  - 1. #3 bars: 19 inch
  - 2. #4 bars: 25 inch
  - 3. #5 bars: 31 inch
  - 4. #6 bars: 57 inch
- L. Verify that anchorages embedded in concrete attached to structural steel members are properly placed. Embed anchorages in every second joint.
- M. Reinforce corners and intersections by lapping horizontal joint reinforcement or by using preformed pieces.

### 3.08 MASONRY FLASHINGS

- A. Provide flashings at all penetrations through the exterior wall.
- B. Install membrane flashing per manufacturer's instruction. Apply primer to substrate. Allow to dry. Install a stainless steel drip edge at the face of the veneer. Set drip in two beads of sealant.
- C. Flashing shall extend to the wall face with the hemmed drip edge exposed out of the wall. Flexible flashing to adhere on top of drip.
- D. Water dam shall be located at the end of all flashing runs, except at base of wall.
- E. Provide flashings at all penetrations through the exterior wall.
- F. Flashing to be installed before the air barrier.
- G. Install on aluminum termination bar the full length of the flashing at the top edge. Secure with stainless steel masonry screws at 16 inches on center.

### 3.09 LINTELS

- A. Install loose steel lintels as scheduled and furnished under Section 05500.
- B. All steel lintels shall be hot-dip galvanized after fabrication, unless noted otherwise, under Section 05500. Touch up marks and scratches on lintels with hot-dip galvanizing spray paint prior to placement in wall construction.
- C. Install reinforced unit masonry lintels over openings where steel lintels are not scheduled or unless otherwise shown. Construct lintels using grout fill and reinforcing. Maintain minimum 8 inch bearing on each side of opening.
- D. Use single piece reinforcing bars only.
- E. Place and consolidate grout fill without displacing reinforcing.
- F. Allow masonry lintels to attain specified strength before removing temporary supports.

### 3.10 STONE INSTALLATION

- A. The backs, beds, and joints of the stone pieces shall be coated with a cementitious waterproofing stone backing. All concrete surfaces on which the limestone will rest shall be coated with a cementitious waterproofing stone backing.
- B. Set stone in full mortar setting bed to support stone over full bearing surface and to establish joint dimensions.
- C. All stone joint surfaces not thoroughly wet shall be drenched with clear water just prior to setting.
- D. All sills shall be set with filled vertical joints. Rake out the joints 5/8 inch deep. After setting, backer rod and sealant shall be installed by Section 07920.

### 3.11 GROUTED COMPONENTS

- A. Install grout as provided under Section 04100.
- B. Remove excess mortar from grout spaces.
- C. Place and consolidate grout fill without displacing reinforcing.
- D. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening, unless noted otherwise.
- E. Work grout into masonry cores and cavities to eliminate voids.
- F. Do not grout in lifts greater than 12 inches without consolidating grout by rodding.

- G. Top of lift shall terminate a minimum of 1-1/2 inches from mortar joint, except at opening or top of wall.
- H. Install grout per ACI 530.

### 3.12 PREPARATION TO GROUT

- A. Block cells do have to align but it is best. See ACI 530-02, S-23 and S-24 for minimum grout space required and grout pour height.
- B. Must allow enough time for mortar to set so enough strength is gained to withstand the pressure of the fluid grout. For grout pours from 1 to 5 feet, wait 12 to 18 hours before grouting. For 12 inch and less pours, you can grout as each course is laid.
- C. Prevent excess mortar from extruding or falling into grout spaces. Mortar that projects more than 1/2 inch into the grout space shall be removed.
- D. At the foundation:
  - 1. Grout must come in contact with the foundation.
  - 2. Dowels in foundation must align with cores to be grouted.
- E. Lap rebar shall be in accordance to ACI-530-02.
- F. Place rebar in rebar positioners.

### 3.13 GROUTING

- A. Grout to be provided from a ready-mix truck at the site or from a silo located on site. Trucking in tubs from an off-site location is not acceptable.
- B. Grout should be moved from the mixer to the point of deposit as fast as practical.
- C. Test grout slump. Must be 8 to 11 inch slump. (See TEK 9.4.)
- D. Place grout within 1-1/2 hours of mixing and prior to initial set.
- E. Grout lift height not to exceed 5 feet.
- F. Grout pour height not to exceed ACI 530-02 Table 7 page S-24 in each day.
- G. Consolidate and reconsolidate grout.
  - 1. Consolidate grout pours 12 inches or less in height by mechanical vibration or puddling. Puddle with a wooden stick.
  - 2. Consolidate pours exceeding 12 inches in height by mechanical vibration and reconsolidate by mechanical vibration after initial water loss and settlement has occurred.
  - 3. Use a low velocity vibrator with a 3/4-inch head. The vibrator is activated for one to two seconds in each grout cell.

- 4. Reconsolidation should generally take place between 3 and 10 minutes after placement. It must be done before plasticity is lost.
- H. Grout may be placed by pouring from a bucket.
- I. Stop lift at minimum 1-1/2 inch above or below a bed joint except the final pour.

#### 3.14 CONTROL JOINTS

- A. Do not continue horizontal joint reinforcement through control and expansion joints, unless noted otherwise.
- B. Use preformed control joint block (sash) units on both sides of control joint, unless shown otherwise on Drawings.
- C. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance to manufacturer's instructions.

#### 3.15 BUILT-IN WORK

- A. As work progresses, build in metal door frames fabricated metal frames, window frames, wood nailing strips, anchor bolts, lintels, and other items furnished by other Sections.
- B. Build in items plumb and level.
- C. Bed anchors of metal door frames in adjacent mortar joints. Fill frame voids solid with grout. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.
- D. Do not build in organic materials subject to deterioration.

#### 3.16 CUTTING AND FITTING

- A. Cut and fit for chases, pipes, conduit, sleeves and ground. Coordinate with other Sections of work to provide correct size, shape, and location.
- B. Obtain architect/engineer approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.
- C. Do not impair appearance of stone by cutting.

#### 3.17 CLEANING

- A. The concrete block shall be cleaned with water and non-metallic tools at the end of each workday or within 24 hours of laying in units of excess mortar and mortar smears.

- B. Within two weeks of initial placement, the masonry shall be cleaned of all excess mortar, smears, and residue with a masonry cleaning solution.
  - 1. **Extreme caution must be taken with cleaning the wall or damage to the masonry can result.** The mortar must be maintained in a condition that after cleaning, the “skin” still remains on the mortar and no discoloration occurs to the mortar, brick, stone, or other components in or around the wall. The mason will take full responsibility for all damage that occurs during cleaning which could result in the requirement to replace the masonry construction.
  - 2. All cleaners utilized must be acceptable to the brick manufacturer.
  - 3. Follow the brick manufacturers and cleaning solution manufacturer’s procedures and recommendations.
  - 4. The cleaning solution must be premixed at the mason’s shop in 55-gallon drums to the recommended dilution rate by the cleaning products manufacturer’s recommendations.
  - 5. A small test area of the building will be cleaned with the solution.
  - 6. The wall is to be washed starting at the top and working all the way down to the bottom. Before applying the cleaning solution, the wall must be thoroughly soaked with water.
  - 7. The wall must be thoroughly rinsed with water to remove the masonry cleaning solution.
- C. Stone shall be washed with fiber brushes, mild detergent, or detergent and clean water or approved mechanical cleaning process.
- D. Special consideration and protection shall be provided for the stone when the exterior masonry is cleaned after the limestone. Strong acid compounds used for cleaning the masonry will burn and discolor the limestone shall not be used.
- E. Power washing of any kind is not acceptable.

### 3.18 REPAIRING DAMAGED STONE

- A. Repair of stone is an accepted practice and will be permitted. Some chipping is expected; repair of small chips is not required if it does not detract from the overall appearance of the work, or impair the effectiveness of the mortar or sealant. The criteria for acceptance of chips and repairs will be per standards and practices of the Industry unless other criteria are mutually agreed upon by the limestone supplier and the Architect.

### 3.19 PROTECTION OF INSTALLED CONSTRUCTION

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

- B. At all times, stone shall be adequately protected from mortar droppings. Whenever necessary, substantial wooden covering shall be placed to protect the stonework. Non-staining building paper or membrane shall be used under the wood. Maintain all covering until removed to permit final clearing of the stonework.
- C. At day's end, cover unfinished walls to prevent moisture infiltration.

END OF SECTION

## DIVISION 5 - METALS

### SECTION 05500

#### METAL FABRICATIONS

##### PART 1 GENERAL

###### 1.01 SECTION INCLUDES

- A. Shop fabricated metal items.

###### 1.02 RELATED SECTIONS

- A. Section 03300 - Cast-In-Place Concrete: Execution requirements for embedded anchors and attachments for metal fabrications specified by this section in concrete.
- B. Section 04300 - Unit Masonry: Execution requirements for embedded anchors and attachments for metal fabrications specified by this section in masonry.

###### 1.03 REFERENCES

- A. ASTM A36/A36M - Carbon Structural Steel.
- B. ASTM A53 - Pipe, Steel, Black and Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.
- C. ASTM A123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- D. ASTM A153/A153M - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- E. ASTM A283/A283M - Low and Intermediate Tensile Strength Carbon Steel Plates.
- F. ASTM A307 - Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
- G. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- H. ASTM A325M - Standard Specification for High-Strength Bolts for Structural Steel Joints (Metric).
- I. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
- J. ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- K. ASTM B177 - Chromium Electroplating on Steel for Engineering Use.
- L. AWS A2.4 (American Welding Society) - Symbols for Welding, Brazing, and Nondestructive Examination.

- M. AWS D1.1 (American Welding Society) - Structural Welding Codes.
- N. SSPC (Steel Structures Painting Council) - Painting Manual.

#### 1.04 SUBMITTALS

- A. Submit under provisions of Section 01330.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable. Indicate welded constructions using standard AWS A2.0 welding symbols. Indicate net weld lengths.
- C. Welders Certificates: Certify welder employed on the work, verifying AWS qualification within previous 12 months.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling requirements.
- B. Accept metal fabrications on site in labeled shipments. Inspect for damage.
- C. Protect metal fabrications from damage by exposure to weather.

#### 1.06 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on Shop Drawings.

### PART 2 PRODUCTS

#### 2.01 MATERIALS

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A500, Grade B.
- C. Plates: ASTM A36.
- D. Pipe: ASTM A53, Grade B Schedule 40.
- E. Fasteners: Expansion anchors.
- F. Bolts, Nuts, and Washers: ASTM A325 galvanized to ASTM A153/A153M for galvanized components.
- G. Anchor Bolts: ASTM A307 or expansion type as detailed.
- H. Welding Materials: AWS D1.1; type required for materials being welded.



- I. Shop and Touch-Up Primer: SSPC-15, Type 1, red oxide.
- J. Touch-up Primer for Galvanized Surfaces: SSPC-20, Type I - Inorganic.

## 2.02 COMPONENTS

- A. Following is list of principal items only. Refer to drawings for items not specifically scheduled.
- B. Water Heater Shelf: Prime paint finish.
- C. Lintels: As detailed; hot-dipped galvanized.
- D. Anchor Bolts: Unfinished.
- E. Window Sill Support Angle: As detailed, hot-dipped galvanized.

## 2.03 FABRICATION

- A. Fit and shop assemble in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Continuously seal joined members by continuous welds.
- D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- G. Prepare surfaces in accordance to SSPC SP3. Surfaces exposed to view shall have the surface prepared in accordance to SSPC SP6.

## 2.04 FACTORY APPLIED FINISHES

- A. Prepare surfaces to be primed in accordance to SSPC SP 6.
- B. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- C. Do not prime surfaces in direct contact with concrete or where field welding is required.
- D. Prime paint items with one coat except where galvanizing is specified.

## 2.05 FABRICATION TOLERANCES

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation from Plane: 1/16 inch in 48 inches.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Section 01330 - Administrative Requirements: Coordination and project conditions.
- B. Verify that field conditions are acceptable and are ready to receive work.

### 3.02 PREPARATION

- A. Clean and strip primed Steel items to bare metal where site welding is required.
- B. Supply items required to be cast into concrete or embedded in masonry with setting templates to appropriate sections.

### 3.03 INSTALLATION

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Make provisions for erection stresses. Install temporary bracing to maintain alignment, until permanent bracing and attachments are installed.
- C. Field weld components indicated on shop drawings.
- D. Perform field welding in accordance to AWS D1.1.
- E. Obtain approval of architect/engineer prior to site cutting or making adjustments not scheduled.
- F. After erection, prime welds, abrasions and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

END OF SECTION

## SECTION 06100

### FRAMING AND SHEATHING

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Structural roof framing.
- B. Roof, wall, and ceiling sheathing.
- C. Pressure treated lumber.
- D. Miscellaneous framing, sheathing, nailers, and blocking.

##### 1.02 REFERENCES

- A. American Lumber Standards Committee (ALSC):
  - 1. Softwood Lumber Standards.
- B. American National Standards Institute (ANSI):
  - 1. ANSI A135.4 - Basic Hardboard.
  - 2. ANSI A208.1 - Mat-Formed Wood Particleboard.
- C. American Plywood Association (APA).
- D. American Wood-Preservers' Association (AWPA):
  - 1. AWPA C1 - All Timber Products Preservative Treatment by Pressure Process.
- E. National Forest Products Association (NFPA).
- F. National Institute of Standards and Technology (NIST):
  - 1. NIST PS 20 - American Softwood Lumber Standard.
- G. Southern Pine Inspection Bureau (SPIB):
  - 1. SPIB - Standard Grading Rules for Southern Pine Lumber.
- H. Western Wood Products Association (WWPA):
  - 1. WWPA G-5 - Western Lumber.

##### 1.03 QUALITY ASSURANCE

- A. All lumber and plywood shall bear a grading stamp exposed to view.

## PART 2 PRODUCTS

### 2.01 LUMBER MATERIALS

- A. Lumber Grading Rules: SPIB and WWP.
- B. Lumber Framing: 19 percent maximum moisture content.
  - 2x4s: SPF Standard Grade,  $F_b = 550$  psi
  - 2x6s: SPF Stud Grade,  $F_b = 675$  psi
  - 2x8s and 2x10s: Hem Fir No. 2 and better,  $F_b = 850$  psi
  - 2x12s: DF No. 2 and better,  $F_b = 825$  psi.
- C. Nailers and Blocking: Spruce-Pine-Fir or Hem Fir No. 2 or better, 19 percent maximum moisture content.
- D. Pressure Treated Lumber: Southern Pine No. 2 or better, preservative treated conforming to U1-12 Standards of the American Wood Protection Association. Each piece shall be treated in accordance to AWWPA standards and certified by an approved inspection agency. The wood shall be pretreated to the following Use Categories:
  - 1. Wood in an interior location in contact with concrete or masonry: UC2.
  - 2. Wood in an exterior location in contact with concrete or masonry: UC4A.

### 2.02 SHEATHING MATERIALS

- A. Roof and Wall Sheathing: Plywood, APA Rated Sheathing, Exposure 1, unsanded, Group 2; or OSB, APA Rated Sheathing, Exposure 1.
- B. Pressure Treated Plywood: APA Rated Sheathing, Grade C-D, Exterior, unsanded, Group 2, pressure treated with CCA or ACQ same as lumber.
- C. Ceiling Sheathing (for Storage and Mechanical Rooms only): Plywood, sanded, Grade A-C.

### 2.03 ACCESSORIES

- A. Masonry Screws: Tapcons. Stainless steel where noted on drawings.
- B. Galvanized ring shank nails.
- C. Metal Connectors: Hot dipped galvanized steel, sized to suit framing conditions, manufactured by Simpson, Kant Sag.
- D. Nails.
- E. Sill Gasket: Closed cell polythene foam in continuous rolls.

- F. H clips.
- G. Aluminum screws.

## PART 3 EXECUTION

### 3.01 FRAMING

- A. Set structural members level and plumb, in correct position.
- B. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
- C. Place horizontal members crown side up.
- D. Construct load bearing framing members full length without splices.
- E. Set members level and plumb, in correct position.
- F. Fasten members in place. Anchor lumber together with nails. Anchor lumber to masonry with masonry screws or bolts as detailed. Anchor plywood to lumber with nails. Anchor privacy screen boards to framing with aluminum screws.
- G. Provide pressure treated lumber at all locations in contact with concrete or masonry.
- H. Provide headers for all openings.
- I. Place sill gasket directly on concrete masonry units. Puncture gasket clean and fit tight to protruding anchor bolts.

### 3.02 ROOF SHEATHING

- A. Install with the long dimension of the panel across supports, and with panel continuous over two or more spans. Suitable edge support shall be provided where indicated on drawings or in recommendations of the American Plywood Associates by use of panel clips, tongue-and-groove panels, or lumber blocking between joists. Panel end joints shall occur over framing. Allow 1/8 inch spacing at panel ends and 1/4 inch at panel edges, unless otherwise recommended by the panel manufacturer.
- B. Nail 6 inches on center along panel edges and 12 inches on center at intermediate supports; except, when supports are spaced 48 inches on center or more, space nails 6 inches on center at all supports. Use 6d common nails for panels 1/2 inch and less and 8d for greater thicknesses; except, when panels are 1-1/8 inch or 1-1/4 inch, use 8d ring-shank or 10d common.

### 3.03 WALL SHEATHING

- A. At wood studs, nail 6 inches on center along panel edges and 12 inches on center at intermediate support with 6d common nails for panels 1/2 inch and less, and 8d for greater thicknesses.
- B. Allow 1/8 inch spacing at panel ends and 1/4 inch at panel edges, unless otherwise recommended by the panel manufacturer.

### 3.04 CEILING SHEATHING

- A. Nail 6 inches on center along panel edges and 12 inches on center at intermediate support with 8d common nails for panels 1/2 inch and less, and 8d for greater thicknesses.
- B. Allow 1/16 inch spacing at panel ends and 1/16 inch at panel edges, unless otherwise recommended by the panel manufacturer.

### 3.05 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.

END OF SECTION

## SECTION 06170

### PLATE CONNECTED WOOD TRUSSES

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Shop fabricated wood trusses for roof framing.
- B. Bridging, bracing, and anchorage.
- C. Connectors.

##### 1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM A446 - Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
  - 2. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- B. National Forest Products Association (NFPA).
- C. National Institute of Standards and Technology (NIST):
  - 1. NIST PS 20 - American Softwood Lumber Standard.
- D. Southern Pine Inspection Bureau (SPIB):
  - 1. SPIB - Standard Grading Rules for Southern Pine Lumber.
- E. Truss Plate Institute (TPI):
  - 1. TPI 1 - National Design Standard for Metal Plate Connected Wood Truss Construction.
  - 2. TPI BWT-76 - Bracing Wood Trusses.
  - 3. TPI DSB-89 - Recommended Design Specification for Temporary Bracing of Metal-Plate-Connected Wood Trusses.
  - 4. TPI HIB-91 - Handling, Installing and Bracing Metal-Plate-Connected Wood Trusses.
  - 5. TPI PCT-80 - Metal Plate Connected Parallel Chord Wood Trusses.
  - 6. TPI QST-88 - Metal Plate Connected Wood Trusses.
  - 7. TPI 85 - Metal Plate Connected Wood Trusses.
- F. Western Wood Products Association (WWPA):
  - 1. WWPA G-5 - Western Lumber Grading Rulers.

### 1.03 SYSTEM DESCRIPTION

- A. Trusses shall be designed in accordance to “National Design Specifications for Stress-Grade Lumber and its Fastenings” (NDS) by National Forest Products Association and “Design Specifications for Metal Plate Connected Wood Trusses” by Truss Plate Institute (TPI), latest editions, and the rules of the Department of Commerce, State of Wisconsin.

### 1.04 SUBMITTALS

- A. Shop Drawings: Indicate sizes and spacing of trusses, loads and truss cambers, framed openings. Submit design calculations.
- B. Product Data: Provide truss configurations, and bridging and bracing.

### 1.05 QUALITY ASSURANCE

- A. Perform Work in accordance to the following:
  - 1. Lumber Grading Agency: Certified by NIST PS 20.
- B. Truss Design, Fabrication, and Installation: In accordance to ANSI/TIP 1 and TPI HIB-91.

### 1.06 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.
- B. Design trusses under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State of Wisconsin.

### 1.07 REGULATORY REQUIREMENTS

- A. Conform to Wisconsin Building code for loads, seismic zoning, and other governing load criteria.

### 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Handle and storage of trusses in accordance to manufacturer’s instructions and the Truss Plate Institute (TPI HET-91) recommended practices.
- B. Store trusses in a vertical position on a flat surface, raised 4 to 6 inches off the supporting surfaces, supports spaced 8 to 10 feet on center. Cover the trusses to protect from the weather elements but allow air to flow through the trusses.

### 1.09 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.



## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. All lumber used for truss members shall be in accordance to the published values of a recognized rules writing agency and shall bear the grade stamp of that agency.
- B. Connector plates shall be manufactured of not less than 20 gauge steel and shall meet or exceed ASTM A446 and shall be galvanized according to ASTM A525.

### 2.02 FABRICATION

- A. Fabrication shall be in accordance to Truss Plate Institution recommended practices.
- B. Fabricate chord extensions as indicated on drawings.

### 2.03 CONNECTOR

- A. As noted on drawings.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that supports and openings are ready to receive trusses.

### 3.02 PREPARATION

- A. Coordinate placement of bearing items.

### 3.03 ERECTION

- A. Erect trusses in accordance to manufacturer's instructions and the Truss Plate Institution (TPI HET-91) recommended practices.
- B. Set members level and plumb, in correct position.
- C. Make provisions for erection loads and for sufficient temporary bracing to maintain structure plumb and in true alignment until completion of erection and installation of permanent bracing.
- D. Do not field cut or alter structural members without approval of architect/engineer.
- E. Trusses shall not be cut, added onto, or altered in any way without the consent of the Architect.
- F. Install metal connectors at locations indicated on drawings.

- G. Brace trusses as required by manufacturer and as noted on the drawings.
- H. All trusses shall be toenailed with two 16d nails to each interior wall the truss crosses.

#### 3.04 TOLERANCES

- A. Framing Members: 1/2 inch maximum, from true position.

END OF SECTION

SECTION 06200  
FINISH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Interior tongue and groove wood ceiling and trim.
- B. Privacy fence.
- C. Fasteners.

1.02 RELATED SECTIONS

- A. Section 09900 - Painting: Painting and finishing of finish carpentry items.

1.03 REFERENCES

- A. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
- B. AWI - Quality Standards.
- C. PS 20 - American Softwood Lumber Standard.

1.04 REGULATORY REQUIREMENTS

- A. Conform to applicable code for fire retardant requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect work from moisture damage.

1.06 COORDINATION

- A. Coordinate the work with plumbing and electrical rough-in and installation of associated and adjacent components.

1.07 WARRANTY

- A. Deck Boards: Furnish manufacturer's 10-year warranty against rot, decay, splitting, checking, splintering, fungal damage, and termite damage.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Tongue and Groove Wood Ceiling: 1x8 tongue and groove knotty pine car siding with a center V-groove, No. 2 and better.
- B. Trim: Ponderosa Pine C select or better, maximum moisture content of 12 percent; mixed grain, of quality suitable for transparent finish.
- C. Fence Boards: Wood-plastic composite lumber, 1-inch x 5 ½-inch deck boards, square shouldered, Trex Transcend Decking or Equal. Color: Design based on Trex, Spiced Rum.

### 2.02 FASTENERS

- A. Fasteners: Of size and type to suit application.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

### 3.02 INSTALLATION

- A. Install work in accordance to AWI Premium Quality Standard.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.
- D. Install components with fasteners.

### 3.03 PREPARATION FOR SITE FINISHING

- A. Set exposed fasteners.
- B. Site Finishing: Refer to Section 09900.

### 3.04 ERECTION TOLERANCES

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION

DIVISION 7 - THERMAL AND MOISTURE PROTECTION  
SECTION 07212

BOARD INSULATION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Board insulation at perimeter foundation wall, underside of floor slabs, and cavity wall construction.

1.02 REFERENCES

- A. ANSI/ASTM D2842 - Water Absorption of Rigid Cellular Plastics.
- B. ASTM C578 - Preformed Cellular Polystyrene Thermal Insulation.
- C. ASTM E96 - Test Methods for Water Vapor Transmission of Materials.

1.03 ENVIRONMENTAL REQUIREMENTS

- A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

PART 2 PRODUCTS

2.01 INSULATION MATERIALS

- A. Polystyrene Insulation Type A: ASTM C578 Type IV; extruded cellular type, conforming to the following:
  - 1. Thermal Resistance: 5 year aged R values of 5.4 and 5.0 minimum at 40°F and 75°F respectively.
  - 2. Thickness: Thickness indicated in schedule.
  - 3. Compressive Strength: Minimum 25 psi.
  - 4. Water Absorption: In accordance to ASTM C272 0.1 percent by volume maximum.
- B. Manufacturers:
  - 1. DiversiFoam Products.
  - 2. Dow Styrofoam Brand.
  - 3. Foamular.

2.02 ADHESIVES

- A. Adhesive: Type recommended by insulation manufacturer for application.

## 2.03 FOAM SEALANT

- A. Polyurethane insulating foam sealant; one-component, gun or straw applied; UL classified; containing no solvents, CFC's or VOC's; moisture-resistant.
- B. Products:
  - 1. Great Stuff by Dow Chemical Company.
  - 2. Handi-Foam by FOMO.
  - 3. Kwik Foam by DAP, Inc.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation boards are dry and ready to receive insulation and adhesive.
- B. Verify substrate surface is flat, free of fins, irregularities, and materials or substances that may impede adhesive bond.

### 3.02 INSTALLATION

- A. Foundation Perimeter:
  - 1. Adhere insulation to wall by applying 2-inch diameter spots of adhesive to insulation boards at 16 inches on center both ways.
  - 2. Butt edges and ends tight to adjacent board and to protrusions.
  - 3. Cut and fit insulation tight to protrusions or interruptions to insulation plane.
- B. Under Concrete Slabs:
  - 1. Place insulation under slabs on grade after base for slab has been compacted.
  - 2. Prevent insulation from being displaced or damaged while placing vapor retarder and slab.
  - 3. Cut and fit insulation tight to protrusions or interruptions to insulation plane.
- C. Cavity Walls:
  - 1. Do not install until air/vapor barrier system of Section 07272 installation is complete.
  - 2. Apply 2-inch diameter daub of adhesive spaced approximately 12 inches on center both ways on inside face of insulation boards.
  - 3. Install boards horizontally between wall reinforcement.
  - 4. Place boards in a method to maximize contact bedding. Stagger joints. Butt edges and ends tight to adjacent board and to protrusions.
  - 5. Cut and fit insulation tight to protrusions or interruptions to insulation plane.

6. Install insulating foam at insulation joints and around penetrations through insulation. Once foam has set up, cut foam back to plane of insulation, so that it does not protrude beyond face of insulation.

### 3.03 PROTECTION OF FINISHED WORK

- A. Do not permit Work to be damaged prior to covering insulation.

### 3.04 SCHEDULES

- A. Perimeter Foundation Wall Insulation: Type A, extruded polystyrene, 2-inch thick, square.
- B. Under Floor Insulation: Type A, extruded polystyrene, 2-inch thick, square.
- C. Cavity Wall Insulation: Type A, extruded polystyrene, 3-inch thick, square edges.
- D. Cavity Wall Insulation at Masonry Returns: Type A, extruded polystyrene, ½-inch thick, square edges.

END OF SECTION



## SECTION 07213

### LOOSE INSULATION

#### PART 1 GENERAL

##### 1.01 WORK INCLUDED

- A. Batt insulation in roofing construction.

##### 1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
  - 2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

#### PART 2 PRODUCTS

##### 2.01 MATERIALS

- A. Batt Insulation: ASTM C665; preformed fiberglass; unfaced. Owens Corning Fiberglas Thermal Batts.

#### PART 3 EXECUTION

##### 3.01 PREPARATION

- A. Verify substrate adjacent materials and insulation are dry and ready to receive installation.
- B. Verify mechanical and electrical services within walls have been installed and tested.

##### 3.02 INSTALLATION

- A. Install in accordance to manufacturer's recommendations.
- B. Install in roof spaces without gaps or voids.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tight in spaces and tight to exterior side of mechanical and electrical services within plane of insulation.

END OF SECTION

## SECTION 07250

### WEATHER BARRIERS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Continuous weather resistive barrier as indicated on Drawings.

##### 1.02 REFERENCES

- A. American Society of Civil Engineer (ASCE):
  - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- B. American Society for Testing and Materials (ASTM):
  - 1. ASTM C920 - Standard Specification for Elastomeric Joint Sealers.
  - 2. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Difference Across the Specimen.
  - 3. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

##### 1.03 SUBMITTALS

- A. Product Data: Submit data on material characteristics, performance criteria, and limitations.
- B. Manufacturer's Installation Instructions: Submit preparation, installation requirements and techniques, and product storage and handling criteria.
- C. Warranty: Unconditional guarantee against weather and construction damage.

##### 1.04 ENVIRONMENTAL REQUIREMENTS

- A. Maintain temperature and humidity recommended by materials manufacturers before, during, and after installation.

#### PART 2 PRODUCTS

##### 2.01 MATERIALS

- A. Acceptable Manufacturer:
  - 1. Typar Metro Wrap.
  - 2. DuPont Tyvek Commercial Wrap.

- B. Fasteners: Per manufacturer's recommendation.
- C. Tape: Per manufacturer's recommendation.

### PART 3 EXECUTION

#### 3.01 INSPECTION

- A. Verify surfaces are ready to receive Weather resistive barrier.
- B. Beginning of installation means acceptance of substrate.

#### 3.02 INSTALLATION

- A. Install full height of wall.
- B. Upper rolls should overlap bottom rolls by 6 inches minimum.
- C. Bottom edge should extend over seam between the sill plate and foundation.
- D. Secure barrier according to manufacturer's recommendations.
- E. Tape all seams. Tape around all penetrations.

#### 3.03 PROTECTION

- A. Weather resistive barrier is to be protected per manufacturer's recommendation.

END OF SECTION

## SECTION 07260

### SHEET MEMBRANE AIR/VAPOR RETARDER

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. A continuous vapor barrier throughout the building to the bottom side of the wood truss bottom chords.

##### 1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
  - 2. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.

#### PART 2 PRODUCTS

##### 2.01 PRODUCTS

- A. Vapor retarder: 6-mil clear polyethylene film for above grade application.
- B. Tape: Heavy-duty, weather-resistant, clear plastic tape, 8-mil thick, approved for use as sealer of plastic vapor retarder.

#### PART 3 EXECUTION

##### 3.01 INSTALLATION

- A. Secure vapor retarder to bottom side of wood ceiling framing and to the inside face of the exterior wall studs with staples.
- B. Air/vapor retarder shall be continuous throughout the building, including over top of interior walls and ceiling. Air/vapor retarder shall be connected to exterior wall air/vapor retarder.
- C. Seams shall be lapped with 4 inches minimum. Tape all seams. Tape the seam at the transition between the ceiling and wall.
- D. Completely seal any tears and punctures with tape.
- E. Seal all penetrations vapor-tight with tape and/or sealant.

END OF SECTION

## SECTION 07272

### FLUID-APPLIED MEMBRANE AIR/VAPOR RETARDER

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. This section includes the following material and installation for a complete air/vapor retarder system for exterior wall, including: liquid-applied air/vapor retarder system located in the non-accessible part of the wall, sheet rubberized-asphalt self-adhered air/vapor retarder membrane, and other materials to bridge and seal air leakage pathways and gaps.

##### 1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM) International:
  - 1. ASTM C836 – Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.
  - 2. ASTM D412 – Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension.
  - 3. ASTM D903 – Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.
  - 4. ASTM D1644 – Standard Test Methods for Nonvolatile Content of Varnishes.
  - 5. ASTM D1970 – Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as a Steep Roofing Underlayment for Ice Dam Protection.
  - 6. ASTM D3767 – Standard Practice for Rubber – Measurement of Dimensions.
  - 7. ASTM D4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
  - 8. ASTM D4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
  - 9. ASTM D5295 – Standard Guide for Preparation of Concrete Surfaces for Adhered (Bonded) Membrane Waterproofing Systems.
  - 10. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
  - 11. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  - 12. ASTM E2178 – Standard Test Method for Air Permeance of Building Materials.
  - 13. ASTM E2357 - Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.

- B. Wisconsin Commercial Building Code, Current Edition.

#### 1.03 PERFORMANCE REQUIREMENTS

- A. Provide air/vapor retarder constructed to perform as a continuous air/vapor retarder, and as a liquid water drainage plane flashed to discharge to the exterior any incidental condensation or water penetration. Membrane shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air seal materials at such locations, changes in substrate and perimeter conditions.
- B. Provide an air retarder assembly that has been tested in accordance ASTM E2357 to provide air leakage results not to exceed: 0.06 cfm/sf at 0.30 inch H<sub>2</sub>O.
- C. Provide vapor retarder assembly that has been tested in accordance to ASTM E96, Method B, to provide results not to exceed: 0.08 perms.
- D. Provide seamless, monolithic air/vapor retarder assembly to a thickness of 60 mils.

#### 1.04 SUBMITTALS

- A. Shop Drawings: Submit showing locations and extent of air/vapor retarder and details of all typical conditions, intersections with other envelope systems and materials, membrane counter-flashings, and details showing how gaps in the construction will be bridged, how inside and outside corners are negotiated and how miscellaneous penetrations such as conduits, pipes electric boxes and the like are sealed.
- B. Manufacturer's Product Data Sheets: Submit for each type of membrane, including manufacturer's printed instructions for evaluating, preparing, and treating substrate, temperature and other limitations of installation conditions, technical data, and tested physical and performance properties.
- C. Manufacturer's Installation Instructions: Submit.
- D. Submit certification by air/vapor retarder manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
- E. Submit certification of compatibility by air/vapor retarder manufacturer, listing all materials on the project that it connects to or that come in contact with it.
- F. Samples: Submit 3 inch by 4 inch minimum size, for each air/vapor retarder material required for Project.
- G. Submit test results of air permeability testing of primary air retarder material (ASTM E2178 or ASTM E283).

- H. Submit installer's certification from product manufacturer.

#### 1.05 QUALITY ASSURANCE

- A. Installer Qualifications:
  - 1. The air retarder contractor and each installing worker shall be certified by the product manufacturer.
  - 2. Each Lead Certified Applicator can supervise a maximum of five (5) registered installers. The Certified Applicator shall be thoroughly trained and experienced in the installation of air retarders of the types being applied. Lead Certified Applicators shall perform or directly supervise all air/vapor retarder work on the project.
- B. Air/vapor retarder installers must be trained and certified by the product manufacturer.
- C. Single-Source Responsibility: Obtain air/vapor retarder materials from a single manufacturer regularly engaged in manufacturing the product.
- D. Products shall comply with all state and local regulations controlling use of volatile organic compounds (VOCs).
- E. Cooperate and coordinate with the owner's inspection and testing agency. Do not cover any installed air and vapor retarder membrane unless it has been inspected, tested, and approved.
- F. Manufacturer's representative shall visit the site to review the installed work prior to the work being covered. Manufacturer shall issue a letter stating that installation and workmanship complies with manufacturer's requirements and written installation instructions.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product, date of manufacture, and directions for storage.
- B. Store materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by air/vapor retarder manufacturer. Protect stored materials from direct sunlight.
- C. Avoid spillage. Immediately notify owner, Architect if spillage occurs and start clean up procedures.
- D. Clean spills and leave area as it was prior to spill.

## 1.07 WASTE MANAGEMENT AND DISPOSAL

- A. Separate and recycle waste materials.
- B. Place materials defined as hazardous or toxic waste in designated containers.
- C. Ensure emptied containers are sealed and stored safely for disposal away from children.

## 1.08 PROJECT CONDITIONS

- A. Environmental Conditions: Apply air/vapor retarder within range of ambient and substrate temperatures recommended by air/vapor retarder manufacturer. Do not apply air/vapor retarder to a damp or wet substrate, unless the manufacturer specifically permits that for the product.
  - 1. Do not apply air/vapor retarder in snow, rain, fog, or mist.
  - 2. Do not apply air/vapor retarder when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the manufacturer.

## 1.09 WARRANTY

- A. Furnish 2-year manufacturer's warranty for liquid and membrane materials.

# PART 2 PRODUCTS

## 2.01 MATERIALS

- A. Liquid Air/Vapor Retarder: Synthetic rubber, spray applied.
  - 1. Air-Bloc 32MR synthetic rubber Air/Vapor Retarder Insulation Adhesive as manufactured by Henry Building Envelope Systems.
  - 2. Perm-A-Barrier® Liquid spray-applied air and vapor retarder by Grace Construction Products.
  - 3. Rub-R-Wall Airtight Air/Vapor Retarder liquid-applied 100% rubber copolymer membrane as manufactured by Rubber Polymer Corporation.

## 2.02 AUXILIARY MATERIALS

- A. Furnish auxiliary materials recommended by air/vapor retarder manufacturer for intended use and compatible with the air/vapor retarder membrane.
- B. Self-Adhesive Membrane Flashing: 32 mils of self-adhesive rubberized asphalt integrally bonded to 8 mil cross-laminated, high density polyethylene film to provide a minimum 40 mil thick membrane shall be interleaved with disposable silicone-coated release paper until installed:
  - 1. Blueskin® TWF by Henry Building Envelope Systems.
  - 2. Perm-A-Barrier® Wall Flashing by Grace Construction Products.
  - 3. Rub-R-Wall SA by Rubber Polymer Corporation.



- C. Primer:
  - 1. Water based liquid primer for extruded polystyrene, concrete, masonry, gypsum sheathing, wood, metal, and painted substrates;
    - a. Aquatac or LVC Adhesive Primer as manufactured by Henry Building Envelope Systems.
    - b. Perm-A-Barrier® WB Primer by Grace Construction Products.
  - 2. Solvent based, VOC compliant primer for concrete, masonry, gypsum sheathing, wood, metal, and painted substrates:
    - a. Bituthene Primer B-2 by Grace Construction Products.
    - b. Rub-R-Wall Primer by Rubber Polymer Corporation.
- D. Mastic, Adhesives, and Tape: Liquid mastic and adhesives, and adhesive tapes as recommended by self-adhesive membrane flashing or liquid membrane air retarder material manufacturer.
- E. Substrate Filler for Rub-R-Wall: Rub-R-Wall Mastic manufactured by Rubber Polymer Corporation.
- F. Sealants provided under Section 07920.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Examine substrates, areas, and conditions under which air/vapor retarder systems will be applied, with Installer present, for compliance with requirements. Verify that surfaces and conditions are suitable prior to commencing work of this section. Do not proceed with installation until unsatisfactory conditions have been corrected.
  - 1. Do not proceed with installation until after minimum concrete curing period recommended by air/vapor retarder manufacturer.
  - 2. Ensure that:
    - a. surfaces are sound, dry, even, and free of oil, grease, dirt, excess mortar or other contaminants
    - b. concrete surfaces are cured and dry, smooth without large voids, spalled areas or sharp protrusions.
    - c. masonry joints are flush and completely filled with mortar, and all excess mortar sitting on masonry ties has been removed.
  - 3. Verify substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D4263.
  - 4. Notify Architect in writing of anticipated problems using air/vapor retarder over substrate.

### 3.02 SURFACE PREPARATION

- A. Clean, prepare, and treat substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air/vapor retarder application.

- B. Prime masonry substrates with conditioning primer when installing modified asphalt membrane transition membranes.
- C. Prime wood, metal, and painted substrates with primer recommended by membrane manufacturer.
- D. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through air/vapor retarder and at protrusions according to air/vapor retarder manufacturer's written instructions.

### 3.03 INSTALLATION

#### A. Air Bloc 32MR:

1. Install materials according to manufacturer's instructions.
2. Transition joints: Prior to the application of the Air Bloc 32MR, seal transitions with primer and Blueskin TWF transition strip at beams, columns, changes in substrate material, and similar joints or connections to provide continuity of air/vapor retarder assembly. Generally, apply transition strips so that a minimum of 3 inches coverage is achieved over both substrates. Position strip over firm bearing.
3. Apply air/vapor retarder membrane within recommended application temperature ranges. Consult manufacturer when membrane cannot be applied within these temperature ranges.
4. Apply Air Bloc 32MR by air assisted spray equipment in a continuous unbroken film at a wet film thickness of 1/8 inch to the substrate. Imbed insulation as work progresses.
5. Ensure that Air Bloc 32MR is applied in full contact around protrusions such as brick ties.
6. Overlap Blueskin TWF transition membrane a minimum of 1 inch.
7. Complete application of membrane to provide a seamless, monolithic surface to a thickness of 60 mils.

#### B. Perm-A-Barrier® Liquid:

1. Install materials in accordance to manufacturer's instructions.
2. Apply waterproofing over concrete block. Fill all voids and holes, particularly in the mortar joints, with a lean mortar mix, non-shrinking grout or parge coat.
3. Treat construction joints and install flashing as recommended by manufacturer.
4. Spray apply a continuous uniform film at 60 mils wet film thickness using multiple, overlapping passes.
5. When spraying use a cross-hatching technique (alternating horizontal and vertical passes) to ensure even thickness and coverage.
6. When spraying use high pressure, multi-component, airless spray equipment approved by material manufacturer.
7. Carry membrane into any openings a minimum of 2 inches.
8. Seal all brick-ties and other penetrations as work progresses.

- C. Application of Transition Membrane for Perm-A-Barrier® Liquid:
1. After allowing the Fluid Applied Membrane to cure to tack-free, apply transition membrane with a minimum overlap of 3 inches onto each surface at all beams, columns and joints as indicated in detail drawings.
  2. Tie in to window and door frames, spandrel panels, roof and floor intersections and changes in substrate.
  3. Use pre-cut, easily handled lengths for each location.
  4. Remove silicone-coated release paper and position flashing carefully before placing it against the surface.
  5. When properly positioned, place against surface by pressing firmly into place by hand roller.
  6. Overlap adjacent pieces 2 inches and roll all seams with a hand roller.
  7. Seal top edge of transition membranes and flashing with termination mastic
  8. Apply liquid membrane to all fastener heads, overlapping board by 1 inch.
- D. Rub-R-Wall:
1. Install materials in accordance to manufacturer's instructions.
  2. Transition joints: Seal with primer and transition strip at changes in substrate material and similar joints or connections to provide continuity of air/vapor retarder assembly. Generally, apply transition strips so that a minimum of 3 inches coverage is achieved over both substrates. Position strip over firm bearing.
  3. Apply air/vapor retarder membrane within recommended application temperature ranges. Consult manufacturer when membrane cannot be applied within these temperature ranges.
  4. Using airless spray equipment having a minimum pressure of 3000 psi, apply prime coat of air/vapor retarder membrane over outer surface of inner wythe masonry.
  5. Use alternating horizontal and vertical passes to ensure complete coverage of substrate and transition strips. Seal masonry anchors or other penetrations air tight.
  6. Check surfaces again and if necessary, fill any remaining gaps with mastic substrate filler prior to covering with membrane.
  7. Complete application of membrane to provide a seamless, monolithic surface to a thickness of 60 mils on masonry walls.
  8. Adhere insulation to air/vapor retarder membrane after initial set time of approximately 1 to 2 hours, and while membrane is still tacky, to prevent convection currents occurring behind the insulation.
- E. Built-in Door Frames: Do not apply air/vapor retarder to door frame. Run air/vapor retarder up to edge of door opening to a location which will not be exposed after perimeter sealant is installed.
- F. Window and Door Frames Not Built In: Lap transition strip from wall substrate with 3 inches of full contact over firm bearing into window or door frame opening with full 1 inch to be installed under installed windows or door frames, unless

noted otherwise. Coordinate installation depth at opening with product or supplier. Membrane shall not be exposed within building.

- G. Wall/Roof Junction: Prime all surfaces. Lap transition strip from wall substrate with 6 inches of full contact over firm bearing to roof air seal membrane with 4 inches of full contact.
- H. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

#### 3.04 PROTECTING AND CLEANING

- A. Protect air/vapor retarder system from damage during application and remainder of construction period, according to manufacturer's written instructions.
- B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.
- C. Protect air/vapor retarder from exposure to the elements as required by the manufacturer.

#### 3.05 PROTECTION AND CLEANING

- A. Remove any masking materials after installation. Clean any stains on materials that would be exposed in the completed work using procedures as recommended by manufacturer.
- B. Protect membranes to avoid damage from other trades, and construction materials during subsequent operations. Protection products may be installed on the same day as the membrane. Extruded polystyrene insulation boards are compatible with membranes. Bonding of the insulation is achieved if the insulation products are installed when the membrane is tacky; generally within 1 to 2 hours after the Procor membrane is installed.
- C. Schedule work to ensure that the air and vapor retarder system is covered as soon as possible after installation. Protect air and vapor retarder system from damage during subsequent operations. If the air and vapor retarder system cannot be covered within 60 days, or shorter time as recommended by manufacturer after installation, apply temporary UV protection such as dark plastic sheet or tarpaulins.

END OF SECTION

## SECTION 07312

### GRANULAR COATED STEEL SHINGLES

#### PART 1 GENERAL

##### 1.01 DESCRIPTION OF WORK

- A. The work under this section includes all labor, material, equipment and related services necessary to install granular coated steel shingles shakes associated system components including metal flashing.
- B. Decorative plumbing vent cover.

##### 1.02 RELATED WORK

- A. Applicable provisions of Division 1 shall govern work under this Section. Contractor shall consult these provisions in detail prior to proceeding with work.
- B. In the event that the contractor wishes to make improvements in materials and/or techniques, or is required to make improvements by his material manufacturer in order to obtain guarantees, he shall make written request stating in full the nature of the proposed changes and stating that the changes, if approved, will be accomplished at no increase in cost.

##### 1.03 REFERENCES STANDARDS

- A. ASTM D522 – 93a – Coating Flexibility Test.
- B. ASTM D2247 – 100% Relative Humidity Test.
- C. ASTM D2794 – 93 – Reverse Impact Test.
- D. ASTM E108 and UL 790 – Class A, B and C Fire Rated.
- E. ASTM G 26 – Accelerated Weathering Test.
- F. CCMC Traffic Load Test.
- G. CCMC Uniform (Snow Load Test) Load.
- H. NBS 23 - Hail Resistance Test
- I. NRCA - Roofing and Waterproofing Manual.
- J. UL 580 and UL 1897 – Roof Deck Construction and Roofing Systems, Uplift Resistance.
- K. UL 2218 – Class 4 Rating – Impact Resistance.

#### 1.04 GUARANTEE AND WARRANTIES

- A. Roof System Guarantee: Provide written 5 year guarantee warranting all roofing and flashing required under contract, to be watertight and free from defects in materials or workmanship for period of time, as stipulated in guarantee form.
- B. Contractor shall perform a minimum of 2 roof system inspections during the term of this guarantee. The first inspection shall be approximately 2 years after installation date on 5 year guarantee with final inspection performed within last 6-months of 5 year guarantee.
- C. Contractor's Performance-Payment Bond is only required to apply to this trade section during the construction period and the first year of the guarantee period. Said Bond shall not apply to any extended guarantee period beyond the first year. Such extended guarantees are limited to the applicable contractor and manufacturer as herein specified.
- D. Manufacturer's Standard Pro-Rated Warranty: Provide manufacturer's granular coated steel shingle/shake standard 50 year warranty against material defects and 120 mph wind, hail stone penetration warranty and surface coating degradation.
- E. Manufacturer's Non-Prorated Period Protection Warranty: Coverage shall include a minimum of 20 years non-prorated protection including cost of labor to remove and replace part or all of the shingle system affecting performance, include replacement of any or all manufacturer products and components included in the system warranty through the non-prorated and annually declining prorated duration of the warranty.
- F. The following information shall be included on all guarantee and warranty documents:
  - 1. Manufacturer material and installation requirements may vary concerning issuance of the non-prorated protection warranty.
  - 2. Include and provide all product(s), labor and installation methods necessary and as specified herein, including manufacturer requirements not found specified herein, as required by the approved manufacturer to obtain the specified warranty requested herein.
  - 3. All products used for adhesive and/or adherence purposes and sealants approved and/or supplied by the manufacturer shall be covered by the manufacturer non-prorated protection warranty specified herein and the State Guarantee.
  - 4. Existing re-installed and new metal flashing and new wood blocking mechanical securement shall be covered in the guarantee but not the manufacturer system warranty specified herein.

## 1.05 QUALITY ASSURANCE

- A. Roofing contractor shall be recognized by the manufacturer of the roof membrane system as an “approved” or “authorized” contractor applicator of their system and all associated products.
- B. Contractor shall have been in business for a minimum of 3 years and within the past 3 years the contractor shall be able to document the successful completion of a minimum of 3 projects of similar size and/or scope of the Work as specified in this Section. Backup documentation/verification may be requested by the owner.
- C. Roofing contractor shall notify the manufacturer in writing of their intent to obtain all system material and send application for the warranty for work required herein. Warranty application document sent to the manufacturer shall include a current date, indicate the owner Project Number, bid document technical Section(s), composition of roof system to be installed per bid documents and be signed by the roofing contractor.
- D. Manufacturer shall provide roofing contractor with a current date written documentation reply stating the receipt of contractor request including warranty application and statement that the roofing contractor is an “approved and authorized contractor applicator” in good standing, for the work specified herein. A copy of this letterhead documentation shall be submitted to owner at the preconstruction meeting. Such document shall include a current date, acknowledgement the owner project number, bid document technical section(s), include the roofing contractor business name, certification status, year of issue and duration of such status.
- E. Changes or variations to the roof system composition as required herein shall be approved by the owner, in writing. Changes provided by the contractor without owner written approved shall be cause for rejection of the Work in its entirety.
- F. Roofing contractor on-site Foreman shall be approved by the manufacturer and shall remain on-site throughout the duration of the project.
- G. Contractor workers employed on this project shall be recognized by the manufacturer of shingle roof system as “approved” or “authorized” applicator(s) and within the past 2 years, the worker shall be able to document the successful completion of a minimum of 3 projects of similar size and/or scope of the Work as specified in this Section.
- H. All roofers by trade, and employed on this project shall have a certificate of successful completion of training, if available from a manufacturer, for the system to be installed. Construction trade employees other than roofers shall not be allowed to perform the work required herein pertaining to the physical placement/installation of any and all of the roof system components specified herein.

- I. Manufacturer certificate of successful completion of training for each roofer employed on this project shall be submitted to owner. Document shall be up to date, indicate worker name, certification status, year of issue and duration of such status.
- J. Contractor shall provide a list of all workers to be employed on this project. The list shall indicate each of the workers by name and their construction trade including the project foreman and contractor main office contact person.
  - 1. List shall include after-hour/weekend emergency phone contact personal and their office and cell phone numbers, for use in case of emergency situations.
- K. Labors, sheet metal workers or other non-roofer employees shall not be allowed to perform the actual installation of any part of manufacturer warranted roof system required by this Section without manufacturer documentation of proper training, as required herein.
- L. Contractor shall obtain and provide owner with the manufacturer's most current dated three-ring or spiral-bound installation and detail manual.
- M. Contractor shall perform work required using details provided within the specifications, on the drawings or as required by the manufacturer for a proper watertight installation and to allow issuance of warranties required herein.
- N. All system components not specifically identified herein but required by the manufacturer for the roof system installed by the Work required in this Section shall be provided and included in the manufacturer watertight warranty as required herein. System components required by the Work in this Section but otherwise not considered as warranted by the manufacturer shall be upgraded to manufacturer specific products at the time of bid such that they are included in the Work covered by the warranty required herein.
- O. Provide all equipment recommended by the manufacturer for proper installation of the materials specified.
- P. Roofing installations shall comply with fire resistive rating as defined in the Wisconsin Administrative Code. Required rating on these roofs: U.L. Class A.
- Q. Prior to the start of construction, it is required that the contractor's foreman shall be in attendance at preconstruction/pre-installation meeting(s).
- R. It is the responsibility of the lead contractor to obtain the services of a competent licensed sub-contractor to perform the Work required by these bid documents.



#### 1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Make no deliveries to the project site until ready to install or approved storage area is provided. The State will not accept delivery nor will the State be responsible for any materials or equipment stored on the premises.
- B. Deliver materials in original unopened containers of packaging clearly labeled with manufacturer's name, brand name, instructions for use, all identifying numbers and U.L. labels.
- C. Deliver materials in sufficient quantity to allow work to proceed without delays.
- D. Materials used on the job must be stored in such a manner as not to create a nuisance or hazard.
- E. Store materials on clean, raised platforms, with breathable, weather protective covering when stored outdoors. Provide continuous protection from materials against weathering and moisture absorption.
- F. Factory applied "shrink-wrapping" is not considered to be an acceptable weather protective covering. Store rolled goods on end; do not double stack rolls. Improper storage practices will be grounds for rejection of questionable materials.
- G. Store primers, coatings, sealants and similar materials between 60 degrees and 80 degrees Fahrenheit.
- H. DO NOT store materials in a manner which will overload any portion of the building.
- I. Handle all materials in a manner which will not damage the material. All damaged materials shall be removed from project site.
- J. Select and operate material handling equipment and store materials as not to damage existing construction or applied roofing, and without overloading the building structural system.

#### 1.07 SUBMITTALS - TECHNICAL AND OTHER DOCUMENTS

- A. MANUFACTURER WARRANTY ACKNOWLEDGEMENT
  - 1. Upon receiving the Contract Offer from the owner, contractor shall immediately notify the manufacturer of intent to purchase the product and to obtain the warranty as specified by this Section.
  - 2. **Submit:** Three copies, on manufacturer letterhead, stating acknowledgement of such notice and agreement to provide the warranty required by this Section. The letterhead acknowledgement shall include the date such letter was issued, owner Project title, Project number, Section number(s), manufacturer representative signature and be addressed to the roofing contractor.

B. CONTRACTOR AND WORKER QUALIFICATION

1. **Submit:** Three copies of manufacturer current written documentation stating the contractor is an "approved contractor applicator" in good standing, for the work specified herein. Document shall be up to date, indicate contractor name, certification status, year of issue and duration of such status.
2. **Submit:** Three copies of the manufacturer certificate of successful completion of training, if available, for each roofer employed on this project. Document shall be up to date, indicate worker name, certification status, year of issue and duration of such status.

C. MANUFACTURER INSTALLATION INSTRUCTIONS

1. **Submit:** One copy of the manufacturer most current version, complete edition paper-copy installation and detail 3-ring or spiral bound manual. Partial submittals taken from within the bound manual are not acceptable.

D. 40-YR ARCHITECTURAL SHINGLE MANUFACTURE LOCATION:

1. **Submit:** Three copies of manufacturer labeling data indicating location of the production plant to verify plant location acceptance, see PART 2 – PRODUCT, MATERIAL herein.

E. SHINGLE ASTM D3462 "CERTIFICATION":

1. **Submit:** Three copies of manufacturer "certified" documentation concerning ASTM D3462.

F. SHINGLE WEIGHT VERIFICATION:

1. **Submit:** Three copies of manufacturer documentation concerning minimum weight per square.
2. Shingle with weight "Not in Conformance" with Contract Document Requirements may be sent to owner for review along with DOA-4253 (C01/96) form "REQUEST FOR SUBMITTAL APPROVAL", found within this bid document.
3. Agency representative shall select shingle color and send color choice verification via e-mail to DFD project manager and contractor.

G. MATERIAL LIST

1. **Submit:** Three copies of a list of all materials intended for use on the project, starting at the roof deck and identified by manufacturer's name, size, thickness, type or grade. List shall be submitted on contractor's letterhead stationery. Submit product data sheets for all materials not included in manufacturer manual.
2. Contractor shall state the following at the bottom of the material list submittal:
3. **"New products installed on this project do not contain asbestos"**.

H. SAFETY REPORT

1. **Submit:** One copy of a written report to be given to the agency representative at the preconstruction meeting, describing in detail the contractor's implementation of specific OSHA regulations, contractor's worker safety program methods/means, roof perimeter safety and identification of the "watch person" required at all roof levels. Identify fire extinguisher and their locations, all equipment/operators on roof/ground in setup/storage area and travel routes used while performing the work.

I. MSDS DATA:

1. **Submit:** One copy of all MSDS paperwork for each product used on this project to be given to the agency representative at the preconstruction meeting.

J. EMERGENCY AND OFFICE CONTACT PHONE LIST:

1. Contractor shall maintain the following at the Project site throughout construction. One copy of the specifications, drawings, addenda, value enhancement, change order and all approved submittals at the project site throughout construction.
2. One copy of the latest version of the manufacturer handbook including details and technical information concerning application techniques for all primary roofing system materials required by the work.
3. One copy of the Material Safety Data Sheets (MSDS) manual for all materials used on this project.

K. SUBMITTALS – FINAL DOCUMENTS REQUIRED UPON COMPLETION OF THE WORK:

1. The following information shall be included on all guarantees, warranty and other submittal documents:
  - a. Agency, city or township, street address where work was performed, building name, owner project number, owner (DOA) building #, all roof areas involved and total sq. ft. of all roof areas.

L. MANUFACTURER ROOF WARRANTY

1. **Submit:** One of the original membrane suppliers warranty of all membrane warranties required herein. (Refer to GUARANTEE article in Part 1 of this Section).

M. MISCELLANEOUS METAL WARRANTY:

1. **Submit:** One original of manufacturer warranty as required by Specification Section 07 63 00.

N. SETTLEMENT CERTIFICATE:

1. **Submit:** One copy of each document.
2. The following information shall be included on all submittal documents;

3. Agency/location/address where work is performed to include the building name, bldg. state number, roof areas, owner project number and total sq. ft. of all roof areas.

O. SITE CONDITIONS

1. Apply roofing in dry weather. All roofing materials installed during rain shall be removed and replaced with dry materials at contractor's expense.
2. DO NOT apply roofing unless authorized by the owner or approved in writing on manufacturer letterhead when the working hour's ambient temperature is below 32 degrees Fahrenheit. Under no circumstances will any seaming, flashing or adhesive activities be allowed when the ambient temperature is below 20 degrees Fahrenheit, or the wind chill factor is below 0 degrees Fahrenheit.
3. Install all rooftop mounted equipment in a watertight manner and repair any damage to sheet metal or other components related to connection and protection of the roof system.
4. Prevent materials from entering and clogging roof drains and conductors including those drains on adjacent low slope roof areas. Remove roof drain plugs when no work is taking place or when rain is forecast.
5. Protection of surfaces: Take every precaution to prevent water leakage, or debris falling into the building interior, or other such occurrences. Contractor is responsible for any and all damage to the building interior or its contents that occur as a direct cause of the work and due to the contractor's methods and mean practice to accomplish the Work required herein.
6. Wall surfaces shall be protected with tarpaulins or other suitable cover to prevent damage, staining or discoloration that might result from operations such as removal, disposal, replacement or removing of equipment or materials to the roof surface. Windows, doorways, walkways, etc. may require special protection measures.
7. The same ground cover protection shall be provided under and/or around dump truck or dump box locations at or alongside the building.
8. Disposal of materials: All materials to be disposed of shall be loaded directly into trucks or drop-off dump-box by means that will prevent damage to existing or new surfaces and to control pollution. Free-fall of debris from heights over 15' will not be allowed.
9. Contractor is responsible for any charges, such as landfill fees, incurred for disposal of materials.

## PART 2 PRODUCTS AND MATERIALS

### 2.01 MANUFACTURER SUPPLIERS AND MATERIALS

- A. All products used in this installation shall be compatible with one another.
- B. Use new materials only; salvaged or used materials are unacceptable.

- C. Approved Metal Shingle Manufactures:
  - 1. Decra Shingle by Decra Roof Systems, Corona, California
  - 2. Metro Shingle by Metro Roof Products, Oceanside, California. Color shall be selected from manufacturer's standard colors. Local manufacturer's representative: Dan Hinkel, (612) 221-9825.
  - 3. Unapproved manufacturer and products installed on the project shall be cause for rejection of the roof system in its entirety and shall be completely replaced by the contractor at no cost to the project.
- D. Color, Design Based on Decra: Woodland Green.
- E. All associated products not specifically mentioned herein but required by the manufacturer for a proper, complete and warranty specified installation shall be included in the bid and provided by the contractor.
- F. Use new materials only; salvaged or used materials are unacceptable and shall be removed from the site and be recycled.
- G. All products used in this installation shall be compatible with one another and the shingle intended for use.
- H. Synthetic Underlayment: ASTM D226, ASTM E-108 Class A Fire, "Sharkskin-Ultra" weight per roll 45#/10sq. roll; "Titanium-UDL", weight per roll 45#/10sq. roll. The aforementioned products have been approved by the owner for use unless the manufacturer requires the use of their synthetic underlayment to obtain warranty required herein. Manufacturer products in use less than 10-years are not acceptable.
  - 1. Cap-nails are required and this requirement shall over-ride manufacturer acceptance of synthetic underlayment fastening with staples or other type fasteners.
  - 2. 15# and 30# Asphalt Underlayment: Are NOT acceptable products unless required by special Project conditions.
- I. Self-Adhering Ice and Water Backup Protection Membrane: Polyethylene surfaced, self-adhering modified bitumen such as W.R. Grace Ice and Water Shield or as approved by the manufacturer as compatible with their shingle or required to obtain the manufacturer non-prorated warranty.
- J. Copper products are not compatible and shall not be installed in this roof system.
- K. Provide matching color ridge vent shingles as manufactured recommended and provided by the manufacture and proper minimum exposure per manufacturer's printed instructions.
- L. Fasteners: Corrosion resistant screws minimum #9 hex 1/4" diameter x 1-1/2" long. Fastener length shall be sufficient to penetration the roof deck minimum 1/2". NAILS ARE NOT ACCEPTABLE.

- M. Sealant: ASTM C920, Type S, Grade NS, Class 25, Use NT, M, G, A or O; FS TT-S-00230C, Type II, Class A; one-part polyurethane base, elastomeric joint sealing compound such as Sika Chemicals "Sikaflex 1a", Sonneborn-Contech "Sonolastic NP1" or Tremco "Dymonic".
- N. Other products, not specifically described, but required for a complete and proper installation of the work in this section shall be selected by the contractor subject to approval by owner.
- O. Granular Coated Steel Roofing Shingle and Shake: Fire, wind and hail resistant roofing shakes as follows:
- P. 26 gauge metals coated with "Zincalume" (Aluminum-Zinc Alloy) corrosion inhibitors and epoxy or acrylic primers, base coating, ceramic coated (ceramically-fired) stones, overglazed.
- Q. Sealants: One-part polyurethane type, as recommended by the shake roofing panel manufacturer
- R. Trim, pipe flashing, vented ridge vent with cottage shake cap, ridge cap end caps, shake V-Batt riser (at starter with continuous standard drip edge below), Z-bar metal all to match stone coated panels and color, other miscellaneous flashing products and accessories of not less than 28 gauge steel, not specifically described, but required for a complete and proper installation of the work in this section.
- S. Decorative Stack Vent Cover: Dual wall decorative vent cover. CapMaster by Mid-American Building Products, (800) 521-8486, or equal. Brown color.

## PART 3 CONSTRUCTION METHODS

### 3.01 EXAMINATION

- A. Examine the areas and conditions under which work in this section will be installed. Notify the owner of any conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.
- B. Proceeding with the work shall signify the contractor's acceptance of the substrate being covered by this work. Notify owner if existing deck is unacceptable for the new work.

### 3.02 SUBSTRATE PREPARATION

- A. Plan work and take whatever action is necessary to prevent dirt and debris from entering the building during the work required by this Section.

- B. 50-yr warranty porcelain enamel steel shake over manufacture recommended water repellant membrane over existing or new roof deck. Supply and install new edge metal, apron, stepflashing, counterflashing , and all required miscellaneous metal flashing for a complete system installation. Align new gutters to drain properly to previously established downspout areas. Mechanically fasten and properly seal all joints with specified sealant. Shingle and edge metal shall have proper overhang and positive drainage into the new gutter to avoid water and ice buildup behind the gutter.
- C. Verify that wood blocking, curbs and nailers are securely anchored and that roof openings and penetrations are in place and set and braced.
- D. Verify that the substrate is clean, dry and free from sharp projections and depressions and that all surfaces and site conditions are ready to receive new materials.

### 3.03 INSTALLATION OF NEW ROOF SYSTEM

- A. Instruct all shingle applicators employed on the project to actually read and become familiar with the manufacturer's written installation instructions as printed on the product wrapper and/or obtained from the manufacturer, and the specific installation requirements within this specification. A copy of the manufacturer's installation instructions and these specifications shall be kept on site for the duration of the project.
- B. Material and installation requirements herein shall take precedence over manufacturer recommended materials and installation instructions unless such Work prevents manufacturer authorization of warranty specified herein.
- C. Install all nailers and wood or metal blocking and/or battens as requirement by specification and/or manufacturer instructions recommendations and/or in accordance to Section 06100.
- D. Pressure Treated Plywood and Lumber: These products shall not be specified or provided for use in roofing projects as a substrate material intended to receive mechanical fasteners used to secure metal roof panels, panel clips, metal coping, roof penetration curbs cap and counterflashing, all other metal flashing, roofing insulation and membrane installations that are a part of the roof system.
- E. The manufacture shall approve of all mechanical fasteners used to secure all roof system components.
- F. Prior to membrane installation, sweep the entire roof deck to remove loose nails, staples, granules, wood dust/particles and other debris and verify that all nails or other fasteners in decking are flush to deck substrate.
- G. Self-Adhering Ice and Water Backup Protection Membrane: Install per specifications and in accordance to the manufacturer's additional detailed instructions, directly to the deck substrate as follows:
  - 1. Eave Edge: Over deck, starting at 1-1/2" beyond the eave and rake edge, up slope a minimum of 5'-0" (two (2) courses) from the roof eave, or more, to achieve a minimum of no-less than a 5'-0" width deck coverage up the slope beyond the exterior finished (heated area) wall of the building.

2. Rake Edge: Over deck, starting at 0'-6" minimum lap onto the eave edge self-adhering ice and water backup protection membrane application and 1-1/2" beyond the rake edge and adhered to fascia, up slope and over the ridge onto the opposite side slope, 0'-6" minimum.
3. Membrane shall be cut, lapped and properly adhered over the eave to provide a void less and complete watertight closure.
4. Deck Penetrations: Over deck, one course wide around all penetration in the field of the roof including curbs, plumbing, mechanical or electrical piping, dormers, other vertical field or roof installations. One course width at all roof to wall locations or other vertical installations. Membrane shall turn up onto all vertical penetrations 4" minimum.
5. Eave membrane and metal terminations shall be installed watertight.
- H. Edge metal shall be fabricated and sized to conceal the self-adhering ice and water backup protection membrane lapped onto fascia. (See Section 07466.)
- I. Edge metal intended to be lapped by another edge metal installation shall be field-cut and notched as required prior to installation to achieve a proper tight-fitting lap. Edge metal shall have proper lap, minimum 1" maximum 2".
- J. Edge metal intended to lap other edge metal installations shall be hand compressed prior to installation to achieve a tight fit at the lap. Nails through the edge metal laps are not acceptable.
- K. Install synthetic underlayment over the entire roof deck area including over self-adhering ice and water backup protection membrane to prevent the shingle from adhering to the self-adhering ice and water backup protection membrane. Omission of the synthetic underlayment over the self-adhering ice and water backup protection membrane shall result in rejection of the work.
  1. Synthetic membrane warranty shall be available for the length of the shingle roof warranty.
  2. Cap-nail fastening of synthetic membrane is mandatory.
  3. Prior to synthetic membrane and shingle installation, sweep the entire roof surface to remove loose nails, staples, granules, wood dust/particles and other debris and verify that all fasteners in membrane installation are installed true and flush.
  4. At Eave: Install synthetic underlayment over edge metal.
  5. At Rake: Install synthetic underlayment under edge metal.
  6. Shingles Installation over the synthetic underlayment:
- L. Install manufacturer supplied starter course.
- M. New shingles shall overhang eave and rake metal edge 3/8" minimum and per manufacturer instructions.
- N. Apply shingles with manufacturer's required shingle exposure to the weather.
- O. Copper shall not be used in the roof system as it is not a compatible product.
- P. Counterflashing may be zinc where roof meets wall areas. Receiver portion of 2-pc counterflashing shall be color matched prefinished metal.
- Q. Check coursing periodically throughout installation and re-align as required by use of a chalk snap line to provide a proper, straight and true vertical and horizontal installation, per manufacturer instructions.



- R. Re-check coursing prior to reaching the ridge and adjust to allow equal shingle exposure after shingle over ridge vent and/or shingle ridge caps are installed.
- S. Check coursing periodically throughout installation and re-align as required.
- T. Periodically during each day of installation, at the end of each day and again at completion, the contractor foreman shall review the shingle installation from the ground, to assure that all shingles are lying flat and proper. Improper substrate condition shall be removed or corrected each day to allow for proper shingle lay down.
- U. Cut opening in decking at ridge to meet the minimum requirement for a vented space.

#### 3.04 CLEANING

- A. Touch up areas where shake mineral coating received damage, using paint kit supplied by the manufacturer to properly match roof system color.
- B. Clean roof surface and replace damaged shakes.
- C. Sweep the entire roof surface to remove loose granules and other debris.
- D. Clean all existing and new gutters and downspouts to be free of roofing debris including shingle and metal cuttings, nails and shingle granules to allow for unobstructed, proper water flow.
- E. Inspect adjacent roof systems, their drain strainers and the grounds below the work area and remove debris associated with this project.
- F. Repair or replace defaced or disfigured finishes caused by work of this section. In areas where finished surfaces are soiled by asphalt or any other source of soiling caused by work of this section, consult manufacturer of surfaces and manufacture of product causing the stain for cleaning advice, product recommendation and conform to their instructions.

END OF SECTION

## SECTION 07466

### METAL SOFFIT, FASCIA, AND SIDING

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Preformed and prefinished metal soffit, fascia, siding and drip edge with related accessory components.
- B. Provide and install a complete system.

##### 1.02 REFERENCES

- A. Aluminum Association (AA) - Aluminum Construction Manual:
  - 1. Aluminum Sheet Metal Work and Building Construction.
- B. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
  - 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
  - 3. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
  - 4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- C. American Society for Testing and Materials (ASTM):
  - 1. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 2. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
  - 3. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- D. Federal Specification Unit (FS):
  - 1. FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.
- E. Sheet Metal and Air Conditioning Contractors (SMACNA):
  - 1. SMACNA - Architectural Sheet Metal Manual, 6<sup>th</sup> Edition.

### 1.03 SUBMITTALS

- A. Product Data: Indicate size, shape, configuration, finish, and framing system.
- B. Samples: Submit samples of colors for selection.

### 1.04 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum 3 years documented experience.
- B. Installer: Company specializing in performing the Work of this section with minimum 3 years documented experience.

### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Protect panels from accelerated weathering by removing or venting sheet plastic shipping wrap.
- B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- C. Prevent contact with materials which may cause discoloration or staining.

### 1.06 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on drawings.

### 1.07 WARRANTY

- A. Warranty: Provide 20-year manufacturer warranty, include coverage for degradation of panel finish including color fading caused by exposure to weather.

## PART 2 PRODUCTS

### 2.01 PRODUCTS

- A. Metal Siding and Trim:
  - 1. Prefinished and preformed 0.040 aluminum with Kynar 500 finish.
  - 2. Flush panel, 12" panel width, non-perforated.
  - 3. PAC-CLAD Flush Soffit Panel or UC-500 Flush Panel System by UNA-CLAD.
  - 4. Trim:
    - a. Fascia to Soffit Flashing.
  - 5. Color, design based on Una-Clad: Sierra Tan

- B. Soffit and Trim:
  - 1. Prefinished and preformed Aluminum.
  - 2. Rollex System 3, 16 inch center-vented soffit panel or equal.
  - 3. Trim: Same material thickness and finish as soffit.
  - 4. Color: Rollex Norwegian Wood
- C. Fascia:
  - 1. Prefinished aluminum, minimum 0.019" thick.
  - 2. Fascia: Shop bent to profiles shown on drawings. Exposed edges to be hemmed.
  - 3. Rollex gutter coil stock or equal.
  - 4. Color:
    - a. Upper Fascia Cover: Rollex Evergreen
    - b. Lower Fascia Cover: Rollex Norwegian Wood
- D. Drip Edge: Prefinished and preformed aluminum, ODE by Rollex or equal. Color as selected by architect.
  - 1. Color: Rollex Evergreen
- E. Fasteners: Manufacturer's standard type to suit application; fastener cap same color as panel.
- F. Field Touch-up Paint: As recommended by panel manufacturer.

## 2.02 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest practical lengths.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that building framing members are ready to receive panel system.

### 3.02 INSTALLATION

- A. Install metal soffit and fascia system in accordance to manufacturer's instructions.
- B. Protect surfaces in contact with cementitious materials and dissimilar metals with bituminous paint. Allow to dry prior to installation.
- C. Fasten soffit to supports; aligned, level, and plumb.
- D. Use concealed fasteners for fastening soffit panel wherever possible.
- E. Coordinate final access door location with Bank Equipment Supplier.

### 3.03 TOLERANCES

- A. Maximum Offset From True Alignment Between Adjacent Members Butting or In Line: 1/16 inch.
- B. Maximum Variation from Plane or Location Indicated on Drawings: 1/4 inch.

### 3.04 CLEANING

- A. Remove site cuttings from finish surfaces.

END OF SECTION

## SECTION 07631

### GUTTERS AND DOWNSPOUTS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Aluminum gutters, downspouts, and accessories and precast concrete splash blocks as shown on the drawings, specified herein, and as needed for a complete and proper installation.

##### 1.02 REFERENCES

- A. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
  - 2. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
  - 3. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
  - 4. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- B. American Society for Testing and Materials (ASTM):
  - 1. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 2. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
  - 3. ASTM B32 - Standard Specification for Solder Metal.
  - 4. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- C. Federal Specification Unit (FS):
  - 1. FS TT-C-494 - Coating Compound, Bituminous, Solvent Type, Acid Resistant.
- D. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
  - 1. Architectural Sheet Metal Manual.

### 1.03 SUBMITTALS

- A. Submit shop drawings and product data for approval by architect prior to fabrication.
- B. Shop Drawings: Indicate general construction, configurations, jointing methods, and fastening methods, locations, and installation details.
- C. Product Data: Submit data on prefabricated components.
- D. Submit manufacturer's installation instructions.
- E. Submit warranties.

### 1.04 QUALITY ASSURANCE

- A. Perform Work in accordance to SMACNA Manual.

### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Section 01600 - Product Requirements: Product storage and handling provisions.
- B. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope to drain.
- C. Prevent contact with materials during storage which may cause discoloration, staining, or damage.

### 1.06 WARRANTY

- A. Provide a limited 20 year warranty on the finish against cracking, crazing, blistering, chipping, peeling, chalking, and fading.
- B. Products shall be warranted to be free of defects in material and workmanship for a period of 5 years from the date of shipment. Repair or replace defective products providing installation instructions have been followed.

## PART 2 PRODUCTS

### 2.01 MATERIALS

- A. Gutters:
  - 1. 0.032 inch prefinished aluminum.
  - 2. 5 inch seamless and supported by concealed brackets.
  - 3. Ogee style

- B. Downspouts:
  - 1. 0.024 inch prefinished and preformed aluminum.
  - 2. 3 inch by 4 inch closed, manufactured downspout, Rollex Rainware, or equal.
- C. End Caps, Downspout Elbows, Joint Fasteners. Profiled to suit gutters and downspouts.
- D. Color as selected by Architect from manufacturer's standard colors.
  - 1. Gutter: Rollex Evergreen
  - 2. Downspout: Rollex Norwegian Wood

## 2.02 ACCESSORIES

- A. Anchorage Devices: Type recommended by fabricator.
- B. Gutter Supports: Concealed brackets.
- C. Downspout Supports: Similar to SMACNA Figure 1-35A.
- D. Splash Blocks: Precast concrete type, minimum 3000 psi at 28 days, with minimum 5 percent air entrainment.

## 2.03 FABRICATION

- A. Field measure site conditions prior to fabricating work.
- B. Form gutters and downspouts of profiles and sizes indicated.
- C. Fabricate with required connection pieces.
- D. Form sections square, true, and accurate in size, in maximum possible lengths and free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
- E. Fabricate gutter and downspout accessories; seal watertight.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work and conditions are as instructed by the manufacturer.
- B. Beginning of installation means acceptance of substrate.



### 3.02 INSTALLATION

- A. Install gutters, downspouts, and accessories in accordance to manufacturer's instructions. Provide a watertight system.
- B. Provide elbow on end of downspout to direct water from building. Maintain 4 inch clearance between end of elbow and splash block.
- C. Set splash blocks under downspouts.

END OF SECTION

## SECTION 07900

### JOINT SEALERS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Preparing sealant substrate surfaces.
- B. Sealant and backing.

##### 1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM):
  - 1. ASTM C804 - Use of Solvent-Release Type Sealants.
  - 2. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
  - 3. ASTM D1056 – Standard Specification for Flexible Cellular Materials - Sponge or Expanded Rubber.
  - 4. ASTM C1193 - Standard Guide for Use of Joint Sealants.
  - 5. ASTM D1565 - Standard Specification for Flexible Cellular Materials- Vinyl Chloride Polymers and Copolymers (Open-Cell Foam).
  - 6. ASTM D1667 - Standard Specification for Flexible Cellular Materials- Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam).
- B. Federal Specification Unit (FS):
  - 1. FS TT-C-00598 - Caulking Compound, Oil and Resin Base Type.
  - 2. FS TT-S-001657 - Sealing Compound, Single Component, Butyl Rubber Based, Solvent Release Type.
  - 3. FS TT-S-00230 - Sealing Compound: Elastomeric Type, Single Component.
  - 4. FS TT-S-001543 - Sealing Compound, Silicone Rubber Base.
- C. Sealing and Waterproofers Institute (SWI):
  - 1. SWI - Sealant and Caulking Guide Specification.

##### 1.03 SUBMITTALS

- A. Product Data: Indicate sealant chemical characteristics, performance criteria, limitations, and color availability.
- B. Submit manufacturer's installation instructions.
- C. Manufacturer Warranty: Include coverage for installed sealants and accessories failing to achieve watertight seal, exhibit loss of adhesion or cohesion, and sealants which do not cure.

#### 1.04 QUALITY ASSURANCE

- A. Conform to Sealant and Waterproofers Institute requirements for materials.
- B. Use adequate numbers of skilled workmen thoroughly trained and experienced in the necessary crafts and completely familiar with the specified requirements and methods needed for proper performance of the work of this Section.
- C. Applicator qualifications:
  - 1. Applicator shall have at least 3 years' experience in installing materials of types specified and shall have successfully completed at least 3 projects of similar scope and complexity.
  - 2. Applicator shall designate a single individual as project foreman who shall be on site at all times during installation.
- D. Single source responsibility for joint sealants:
  - 1. Obtain joint sealants from single manufacturer for each different product required to ensure compatibility.
  - 2. Manufacturer shall instruct applicator in procedures for intersecting sealants.
- E. Perform work in accord with ASTM C-1193 guidelines except where more stringent requirements are indicated or specified.

#### 1.05 ENVIRONMENTAL REQUIREMENTS

- A. Do not install solvent curing sealants in enclosed building spaces.
- B. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

#### 1.06 PRODUCT STORAGE AND HANDLING

- A. Deliver the materials to the job site in the manufacturer's unopened containers with all labels intact and legible at time of use.
- B. Store materials in accord with manufacturer's recommendations with proper precautions to ensure fitness of material when installed.

#### 1.07 SEQUENCING AND SCHEDULING

- A. Coordinate the work of this section with all sections referencing this section.

## 1.08 SUBSTRATE CONDITIONS

- A. Provide joints properly dimensioned to receive the approved sealant system.
- B. Provide joint surfaces that are clean, dry, sound and free of voids, deformations, protrusions, and contaminants that may inhibit application or performance of the joint sealant.

## 1.09 WARRANTY

- A. Deliver to the Architect signed copies of the following written warranties against adhesive and cohesive failure of the sealant and against infiltration of water and air through the sealed joint for a period of 3 years from date of completion.
  - 1. Manufacturer's standard warranty covering sealant materials.

## PART 2 PRODUCTS

### 2.01 GENERAL

- A. Compatibility:
  - 1. Provide joint sealants, joint fillers, and accessory joint materials that are compatible with one another and with joint substrates under project conditions.
  - 2. Install joint sealants, joint fillers, and related joint materials that are nonstaining to visible joint surfaces and surrounding substrate surfaces.
- B. Provide colors selected by Architect from manufacturer's standard color range, unless noted otherwise.

### 2.02 SEALANTS

- A. Polyurethane Sealant:
  - 1. Vertical joints which are bordered on one or both sides by a porous building material such as concrete, natural stone, or masonry or a non-porous building material such as painted metal, anodized aluminum, mill finish aluminum, siding, or PVC. Locations such as interior and exterior door frame, window, and louver perimeters; masonry and stone joints; plumbing, HVAC, and electrical penetrations.
  - 2. Tremco Dymeric 240.
  - 3. or BASF MasterSeal NP2.
- B. Medium Modulus Silicone Sealant:
  - 1. Locations such as at top perimeter of countertops and other plumbing fixtures perimeters requiring sealant.
  - 2. Dow Corning 786, GE Sanitary 1700, or Tremsil 600. Mildew-resistant.

- C. Self-Leveling Polyurethane Sealant:
  - 1. BASF MasterSeal SL 1, Tremco THC-900, or Vulkem 45 SSL.
  - 2. For areas where the slope of the slab makes self-leveling material impractical BASF MasterSeal SL 2, Tremco THC-901, or Vulkem 45 SSL may be used.
  - 3. Locations such as at interior and exterior concrete slab control and perimeter expansion joints.

## 2.03 ACCESSORIES

- A. Primer: Non-staining type, as recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, as recommended by sealant manufacturer; compatible with joint forming materials.
- C. Backer Rod: Polyethylene foam rod or rope or other compatible non-waxing, non-extruding, non-staining resilient material as recommended by sealant manufacturer, closed cell, sized 25 percent wider than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.
- E. Masking Tape: Non-staining, non-absorbent tape product compatible with joint sealants and adjacent joint surfaces that is suitable for masking.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that joint openings are ready to receive work and field measurements are as shown on Drawings and recommended by the manufacturer.
- B. Beginning of installation means installer accepts existing surfaces.

### 3.02 PREPARATION

- A. Prepare surfaces to receive sealants in accordance to sealant manufacturer's instructions and recommendations.
- B. Examine joint sizes and correct as required to allow for anticipated movement and to achieve proper width/depth ratio per manufacturer's recommendations for specified sealant.

- C. Thoroughly clean joint surfaces using cleaners approved by sealant manufacturer, whether primers are required or not.
  - 1. Remove all traces of previous sealant and joint backer by mechanical methods, such as by cutting, grinding and wire brushing, in manner not damaging to surrounding surfaces.
  - 2. Remove paints from joint surfaces except for permanent, protective coatings.
  - 3. Remove wax, oil, grease, dirt film residues, temporary protective coatings and other residues by wiping with cleaner recommended for that purpose. Use clean, white, lint-free cloths and change cloths frequently.
  - 4. Remove loose materials and foreign matter.
  - 5. Remove dust by blowing clean with oil-free, compressed air.
- D. Verify that joint backing and release tapes are compatible with sealant.
- E. Measure joint dimensions and size materials to achieve required width/depth ratios.
- F. Protect elements surrounding the work of this section from damage or disfiguration.

### 3.03 INSTALLATION

- A. Install sealant in accordance to manufacturer's instructions, and SWI "Sealant: The Professional's Guide".
- B. Where necessary to protect adjacent surfaces, mask adjacent surfaces with tape prior to priming and/or caulking.
  - 1. Use masking tape where required to prevent sealant or primer contact with adjoining surfaces that would be permanently stained or otherwise damaged by such contact or the cleaning methods required for removal.
  - 2. Apply tape so as not to shift readily and remove tape immediately after tooling without disturbing joint seal.
- C. Provide backer rod uniformly to depth required by sealant manufacturer for proper joint design using a blunt instrument.
  - 1. Fit securely by compressing backer material 25 percent to 50 percent so no displacement occurs during tooling.
  - 2. Avoid stretching or twisting joint backer.
  - 3. Install to achieve a neck dimension no greater than 1/3 the joint width.
- D. Provide bond-breaker where backer rod is not used or where recommended by sealant manufacturer, adhering strictly to the manufacturers installation requirements.

- E. Prime joint substrates where required.
  - 1. Use and apply primer according to sealant manufacturers recommendations.
  - 2. Confine primers to sealant bond surfaces; do not allow spillage or migration onto adjoining surfaces.
  - 3. Prime immediately prior to caulking.
- F. Install sealants immediately after joint preparation.
- G. Install sealants to fill joints completely from the back, without voids or entrapped air, using proven techniques, proper nozzles, and sufficient force that result in sealants directly contacting and fully wetting joint surfaces.
- H. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- I. Install sealants to uniform cross-sectional shapes with depths relative to joint widths that allow optimum sealant movement capability as recommended by sealant manufacturer.
- J. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- K. Tool sealants in manner that forces sealant against back of joint, ensures firm, full contact at joint interfaces and leaves a finish that is smooth, uniform and free of ridges, wrinkles, sags, air pockets and embedded impurities. Provide concave tooled joints.
- L. Remove sealant from adjacent surfaces in accord with sealant and substrate manufacturer recommendations as work progresses.
- M. Protect joint sealants from contact with contaminating substances and from damages. Cut out, remove, and replace contaminated or damaged sealants, immediately, so that they are without contamination or damage at time of substantial completion.
- N. Clean adjacent surfaces immediately and leave work neat and clean. Remove excess and droppings using recommended cleaners as work progresses. Remove masking tape immediately after tooling of joints.

### 3.04 CLEANING AND REPAIRING

- A. Clean adjacent soiled surfaces.
- B. Repair or replace defaced or disfigured finishes caused by work of this Section.

### 3.05 PROTECTION OF FINISHED WORK

- A. Protect sealants until cured.

### 3.06 COLOR SCHEDULE:

#### A. Exterior:

1. Joint in "Color 1" masonry and perimeter of louver: Tremco Beige.
2. Joints in "Color 2" masonry: Tremco Baptist Brick
3. Perimeter of door frame: Tremco Hartford Green

#### B. Interior:

1. Plumbing Fixture Perimeters: Clear
2. Floor Slab Joints: Match flooring color.
3. Joints in Masonry Walls: Tremco Geographic Beige
4. Perimeter of Door Frame: Tremco Hartford Green

END OF SECTION



DIVISION 8 - DOORS AND WINDOWS  
SECTION 08111

STANDARD STEEL DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Standard steel doors.

1.02 RELATED SECTIONS

- A. Section 08112 - Standard Steel Frames.
- B. Section 08710 - Door Hardware.
- C. Section 09900 - Painting: Field painting of doors.

1.03 REFERENCES

- A. Americans with Disabilities Act (ADA) of 1990, Accessibility Guidelines for Buildings and Facilities, 2010 revision
- B. American Society for Testing and Materials (ASTM):
  - 1. ASTM A525 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
  - 2. ASTM C236 - Test Method for Steady-State Thermal Performance of Building Assemblies by Means of a Guarded Hot-Box.
  - 3. ASTM E413 - Classification for Determination of Sound Transmission Class.
- C. Door Hardware Institute (DHI) - The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.
- D. International Building Code (IBC) 2009 Edition and Referenced Standards with State of Wisconsin Amendments.
- E. Steel Door Institute (SDI):
  - 1. SDI-100 – Recommended Specifications for Standard Steel Doors and Frames.

1.04 SUBMITTALS

- A. Shop Drawings: Indicate door elevations, internal reinforcement, closure method, and cut-outs for glazing and finish.
- B. Product Data: Indicate door configurations, location of cut-outs for hardware reinforcement, and manufacturer literature.

## 1.05 QUALITY ASSURANCE

- A. Conform to requirements of SDI-100 and ANSI A117.1.

## 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept doors on site in manufacturer's packaging. Inspect for damage.
- B. Break seal on-site to permit ventilation.

## 1.07 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

## 1.08 COORDINATION

- A. Coordinate the work with wall opening construction, frame, and hardware installation.

# PART 2 PRODUCTS

## 2.01 DOORS

- A. Manufacturers:
  - 1. Ceko.
  - 2. Curries.
  - 3. Steelcraft.
  - 4. Pioneer.
  - 5. Republic.
- B. Exterior Doors (Non-thermally Broken):
  - 1. SDI-100 Grade III, Flush, 16 gauge, welded seamless edge, flush end closure treatment.
  - 2. Fabricated of galvanized steel ASTM A525 G60.
  - 3. Core: Expanded polystyrene insulation.

## 2.02 FABRICATION

- A. Fabricate doors with lock, hinge, and closer reinforcement welded in place.
- B. Close top of exterior doors with flush end steel channel closure treatment. Seal joints watertight.

## 2.03 FINISH

- A. Baked on primer in accordance to SDI-100.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that opening sizes and tolerances are acceptable.

### 3.02 INSTALLATION

- A. Install doors in accordance to SDI-100 and DHI.
- B. Coordinate installation of doors with installation of frames specified in Section 08112 and hardware specified in Section 08710.

### 3.03 ADJUSTING

- A. Adjust door for smooth and balanced door movement.

END OF SECTION

## SECTION 08112

### STANDARD STEEL FRAMES

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Steel frames.

##### 1.02 WORK FURNISHED BUT INSTALLED UNDER OTHER SECTIONS

- A. Section 04300 - Unit Masonry: Placement of anchors and frames into wall construction.

##### 1.03 RELATED SECTIONS

- A. Section 04100 - Mortar and Masonry Grout: Mortar fill of metal frames.
- B. Section 04300 - Unit Masonry System: Wall opening construction.
- C. Section 05500 - Metal Fabrications: Steel lintels.
- D. Section 07900 - Joint Sealants: Perimeter sealing.
- E. Section 08111 - Standard Steel Doors.
- F. Section 08710 - Door Hardware.
- G. Section 09900 - Painting: Field painting of frames.

##### 1.04 REFERENCES

- A. Americans with Disabilities Act (ADA) of 1990, Accessibility Guidelines for Buildings and Facilities, 2010 revision.
- B. American Society for Testing and Materials (ASTM):
  - 1. ASTM A525 - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- C. Door Hardware Institute (DHI): The Installation of Commercial Steel Doors and Steel Frames, Insulated Steel Doors in Wood Frames and Builder's Hardware.

##### 1.05 SUBMITTALS

- A. Shop Drawings: Indicate frame elevations, reinforcement, and finish.
- B. Product Data: Indicate frame configuration, anchor types and spacings, location of cut-outs for hardware, reinforcement, and manufacturer literature.

## 1.06 QUALITY ASSURANCE

- A. Conform to requirements of SDI-100 and ANSI A117.1.

## 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Accept frames on site in manufacturer's packaging. Inspect for damage.

## 1.08 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on shop drawings.

## 1.09 COORDINATION

- A. Coordinate the work with wall opening construction, door, and hardware installation.

# PART 2 PRODUCTS

## 2.01 FRAMES

- A. Manufacturers:
  - 1. Ceco.
  - 2. Curries.
  - 3. Pioneer.
  - 4. Steelcraft.
  - 5. Republic.
- B. Exterior Frames: 16 gauge thick material, base metal thickness, galvanized steel ATSM A525 G60.

## 2.02 ACCESSORIES

- A. Silencers: Resilient rubber, fitted into drilled hole.

## 2.03 FABRICATION

- A. Fabricate frames as welded unit.
- B. Fabricate frames with hardware reinforcement plates welded in place. Provide mortar guard boxes.
- C. Prepare frame for silencers. Provide three single silencers for single doors and mullions of double doors on strike side. Provide two single silencers on frame head at double doors without mullions.
- D. Fabricate frames to suit masonry wall coursing with 4-inch head member, unless noted otherwise.

## 2.04 FINISH

- A. Baked on primer in accordance to SDI-100.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that opening sizes and tolerances are acceptable.

### 3.02 INSTALLATION

- A. Install frames in accordance to SDI-100 and DHI.
- B. Coordinate with masonry wall construction for anchor placement.
- C. Coordinate installation of frames with installation of hardware specified in Section 08710 and doors in Sections 08112.

END OF SECTION

## SECTION 08520

### ALUMINUM WINDOWS

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Extruded aluminum windows with operating sash; glass shop or site glazed.
- B. Operating hardware and insect screens.
- C. Aluminum sill flashing.

##### 1.02 RELATED SECTIONS

- A. Section 04300 - Unit Masonry System: Wall opening construction.
- B. Section 05500 - Metal Fabrications: Steel lintels.
- C. Section 07900 - Joint Sealers: Perimeter sealant and back-up materials.
- D. Section 08800 - Glazing.

##### 1.03 REFERENCES

- A. Aluminum Association (AA):
  - 1. AA DAF-45 - Designation System for Aluminum Finishes.
- B. American Architectural Manufacturers Association (AAMA):
  - 1. AAMA 101 - Voluntary Specifications for Aluminum, Vinyl (PVC) and Wood Windows and Glass Doors.
  - 2. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.
  - 3. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
  - 4. AAMA 2603 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
  - 5. AAMA 2604 - Voluntary specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
  - 6. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
  - 7. AAMA MCWM-1 - Metal Curtain Wall manual.

- C. American National Standards Institute (ANSI):
  - 1. ANSI Z97.1 - Safety Glazing Materials Used in Buildings Safety.
- D. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- E. American Society of Testing and Materials (ASTM):
  - 1. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 2. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - 3. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  - 4. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric).
  - 5. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
  - 6. ASTM D3656 - Standard Specification for Insect Screening and Louver Cloth Woven from Vinyl-Coated Glass Yarns.
  - 7. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
  - 8. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
  - 9. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
  - 10. ASTM E547 - Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls, and Doors by Cyclic Static Air Pressure Differential.
  - 11. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Curtain Walls, and Doors by Uniform or Cyclic Static Air Pressure Difference.
  - 12. ASTM F588 - Standard Test Methods for Resistance of Window Assemblies to Forced Entry Excluding Glazing.
- F. Glass Association of North America (GANA):
  - 1. GANA - Glazing Manual.
- G. National Fenestration Rating Council Incorporated (NFRC):
  - 1. NFRC 100 - Procedures for Determining Fenestration Product U-Factors.



- H. The Society for Protective Coatings (SSPC):
  - 1. SSPC Paint 20 - Zinc-Rich Primers (Type I - Inorganic and Type II - Organic).
  - 2. SSPC Paint 25 - Red Iron Oxide, Zinc Oxide, Raw Linseed Oil, and Alkyd Primer.

#### 1.04 PERFORMANCE REQUIREMENTS

- A. Design and size components to withstand dead and live loads caused by positive and negative wind pressure acting normal to plane of wall as measured in accordance to ASTM E330.
- B. Assembly: To accommodate, without damage to components or deterioration of seals, movement between window and perimeter framing, deflection of lintel.
- C. Air Infiltration: Limit air infiltration through assembly to 0.1 cfm/min/sq feet of wall area, measured at reference differential pressure across assembly of 6.24 psf as measured in accordance to ASTM E283.
- D. Water Leakage: None, when measured in accordance to ASTM E331, ASTM E1105, or ASTM E547.

#### 1.05 SUBMITTALS

- A. Shop Drawings:
  - 1. Indicate opening dimensions, framed opening tolerances, affected related work and installation requirements.
  - 2. Provide component complete with materials manufacturer product literature, sealants, and finishes.
- B. Product Data: Submit component dimensions, anchorage and fasteners, glass, internal damage, and typical details.
- C. Submit warranty.

#### 1.06 QUALITY ASSURANCE

- A. Perform Work in accordance to the following:
  - 1. Aluminum Windows: Fabricate window assemblies in accordance to AAMA 101 for types of windows required.
  - 2. Insulated Glass: Fabricate insulated glass units in accordance to GANA (formerly FGMA) Glazing Manual.
  - 3. Safety Glass: Conform to ANSI Z97.1 and applicable codes.

#### 1.07 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing commercial aluminum windows with minimum 3 years' documented experience.

- B. Installer: Company specializing in installing commercial aluminum windows with minimum 3 years' documented experience.

#### 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Handle Work of this section in accordance to AAMA MCWM-1 - Curtain Wall Manual #10.
- B. Protect prefinished aluminum surfaces with wrapping or strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

#### 1.09 ENVIRONMENTAL REQUIREMENTS

- A. Do not install glazing materials when ambient temperature is less than 40 degrees F.
- B. Maintain this minimum temperature during and after installation of glazing materials.

#### 1.10 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on Drawings.

#### 1.11 WARRANTIES

- A. Window System:
  - 1. Contractor shall warrant for 1 year the satisfactory performance of the window installation which includes windows, hardware, glass, glazing, and anchorage as called for by the Specifications and approved shop drawings.
  - 2. Window manufacturer shall provide written 5 year warranty against defects in materials and workmanship. Shall include coverage for degradation of color finish.
  - 3. Glass shall be warranted as specified in Section 08800.

### PART 2 PRODUCTS

#### 2.01 WINDOWS

- A. Aluminum Inward Projected Windows: Oldcastle Building Envelope (Moduline), Contemporary Series 42P; poured in place polyurethane thermal barrier; 300 Series stainless steel with nylon 4-bar friction hinge; tamper-resistant key lock with concealed pawl; aluminum removable screens; 1-inch sill receptor.
  - 1. Other acceptable manufacturers: Wausau Window and Wall Systems; Kawneer; EFCO, and Manko.

## 2.02 FLASHING

- A. Aluminum Sill Flashing: 0.040 inch thick anodized aluminum, breaker form to profile, color to match window frame color.

## 2.03 GLASS AND GLAZING MATERIALS

- A. Glass and Glazing Materials: Type A as specified in Section 08800. Glass may be factory glazed under this section or field glazed under Section 08800.
- B. Glaze in accordance to manufacturer's instructions.

## 2.04 PERIMETER SEALANT MATERIALS

- A. Sealant and Backing Materials: As specified in Section 07900.

## 2.05 FABRICATION

- A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- B. Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- C. Prepare components to receive anchor devices. Fabricate anchors.
- D. Arrange fasteners and attachments to ensure concealment from view.
- E. Prepare components with internal reinforcement for operating hardware.
- F. Provide internal reinforcement in mullions with galvanized steel members to maintain rigidity.
- G. Permit internal drainage weep holes and channels to migrate moisture to exterior. Provide internal drainage of glazing spaces to exterior through weep holes.
- H. Assemble insect screen frame, miter and reinforce frame corners. Fit mesh taut into frame and secure. Fit frame with four spring loaded steel pin retainers.

## 2.06 FINISHES

- A. Architectural Class I, two-step color anodizing: AA-M12-C22 A44 #40 dark bronze.
- B. Apply one coat of bituminous or alkali resistant paint to concealed aluminum and steel surfaces in contact with cementitious or dissimilar materials.

## 2.07 ACCESSORIES

- A. Fasteners: Stainless steel fasteners.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify site opening conditions.
- B. Verify wall openings are ready to receive work of this Section.
- C. Beginning of installation means acceptance of substrate.

### 3.02 INSTALLATION

- A. Install window frames, glass, and hardware in accordance to manufacturers instructions.
- B. Anchor window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.
- C. Align window plumb and level, free of warp or twist. Maintain dimensional tolerances and alignment with adjacent work.
- D. Provide thermal isolation where components penetrate or disrupt building insulation. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- E. Coordinate attachment and seal of perimeter air barrier and vapor barrier materials.
- F. Install operating hardware.
- G. Install glass in accordance to manufacturer's instructions and Section 08800.
- H. Windows shall be fastened in place with stainless steel fasteners.
- I. Apply sealants at joints and intersections and at opening interior and exterior perimeter to provide a watertight installation. Wipe off excess material and leave exposed surfaces and joints clean and smooth.

### 3.03 TOLERANCES

- A. Maximum Variation from Level or Plumb: 1/16 inch every 3 feet non-cumulative or 1/8 inch per 100 feet, whichever is less.

### 3.04 ADJUSTING

- A. Adjust hardware for smooth operation and secure weather-tight closure.

### 3.05 CLEANING

- A. Remove protective material from prefinished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
- C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.

END OF SECTION

## SECTION 08710

### DOOR HARDWARE

#### PART 1 GENERAL

##### 1.01 WORK INCLUDED

- A. Hardware for hollow steel doors and frames.
- B. Thresholds.
- C. Gasketting.

##### 1.02 WORK FURNISHED BUT INSTALLED UNDER OTHER SECTIONS

- A. Furnish templates to Sections 08111 and 08112 for door and frame preparation.

##### 1.03 RELATED WORK

- A. Section 08111 - Standard Steel Doors.
- B. Section 08112 - Standard Steel Frames.

##### 1.04 REFERENCES

- A. Americans with Disabilities Act (ADA) of 1990, Accessibility Guidelines for Buildings and Facilities, 2010 revision.
- B. American National Standards Institute:
  - 1. ANSI A117.1 – Accessible and Usable Buildings and Facilities.
  - 2. ANSI A156.1 - Butts and Hinges.
  - 3. ANSI A156.2 - Bored and Preassembled Locks and Latches.
  - 4. ANSI A156.4 - Door Controls - Closures.
  - 5. ANSI A156.5 - Auxiliary Locks and Associated Products.
  - 6. ANSI A156.6 - Architectural Door Trim.
  - 7. ANSI A156.7 - Template Hinge Dimensions.
  - 8. ANSI A156.16 - Auxiliary Hardware.
  - 9. ANSI A156.18 - Materials and Finishes
  - 10. ANSI A156 - Complete Set of 24 BHMA Standards (A156 Series) with Binder.
- C. Architectural Woodwork Institute (AWI).
- D. Builders' Hardware Manufacturers Association (BHMA).
- E. Door and Hardware Institute (DHI).
- F. National Association of Architectural Metal Manufacturers (NAAMM).

- G. Steel Door Institute (SDI).

#### 1.05 QUALIFICATIONS

- A. Manufacturers: Companies specializing in manufacturing door hardware with minimum 3 years' experience.
- B. Hardware Supplier: Company specializing in supplying commercial door hardware with 3 years' documented experience.

#### 1.06 QUALITY ASSURANCE

- A. Perform Work in accordance to the following requirements:
  - 1. ANSI A156 series.

#### 1.07 SUBMITTALS

- A. Submit schedule.
- B. Shop Drawings: Indicate locations and mounting heights of each type of hardware.
- C. Product Data: Submit on specified hardware.

#### 1.08 OPERATION AND MAINTENANCE DATA

- A. Operation and Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

#### 1.09 DELIVERY, STORAGE, AND HANDLING

- A. Package hardware items individually; label and identify package with door opening code to match hardware schedule.
- B. Deliver keys to owner by security shipment direct from hardware supplier.
- C. Protect hardware from theft by cataloging and storing in secure area.

#### 1.10 COORDINATION

- A. Coordinate work of this Section with other directly affected Sections involving manufacturer of any internal reinforcement for door hardware.
- B. Provide templates or actual hardware as required to ensure proper preparation of doors and frames.

#### 1.11 WARRANTY

- A. Closer: Furnish 10 year manufacturer warranty.

## 1.12 MAINTENANCE MATERIALS

- A. Provide special wrenches and tools applicable to each different or special hardware component.
- B. Provide maintenance tools and accessories supplied by hardware component manufacturer.

## PART 2 PRODUCTS

### 2.01 ACCEPTABLE MANUFACTURERS

- A. Hinges: Hager, McKinney, PBB, Stanley.
- B. Latch Sets: Schlage. No substitutions.
- C. Cylinder Locks: Schlage.
- D. Manual Bolts: Hager, Ives.
- E. Removable Mullions: No substitutions.
- F. Push/Pulls: Builders Brass, Hiawatha.
- G. Closers: Dorma, LCN. No substitutions.
- H. Gasketting: National Guard, Reese, Zero.
- I. Protection Plates: Builders Brass, Hager, Hiawatha.

### 2.02 KEYING

- A. Door Locks: Key per owner requirements.
- B. Supply two keys for each lock.
- C. Supply keys per owner requirements.

### 2.03 FINISHES

- A. Finishes are identified in Schedule at end of this section.

## PART 3 EXECUTION

### 3.01 INSPECTION

- A. Verify that doors and frames are ready to receive work and dimensions are as indicated on shop drawings.



- B. Verify that power supply is available to power operated devices.
- C. Beginning of installation means acceptance of existing conditions.

### 3.02 INSTALLATION

- A. Install hardware in accordance to manufacturer's instructions and requirements of SDI and BHMA.
- B. Use the templates provided by hardware item manufacturer.
- C. Mounting heights for hardware from finished floor to center line of hardware item shall comply with ADA and BHMA.
- D. Conform to ADA for positioning requirements for the disabled and accessibility.

### 3.03 SCHEDULE (H.S. = Hardware Set)

#### H.S.1

3 butts	BB1199 32D	(Hager)
1 deadbolt	B6663P	(Schlage)
1 push plate	200H, US32D	(Hiawatha)
1 pull/plate	200F x 581, US32D	(Hiawatha)
1 closer	P4040XP Spring HCush	(LCN)
1 kickplate	190S, 12 inch	(Hager)
1 threshold	425	(NG)
1 jamb seal	A626A	(NG)
1 sweep	C607A	(NG)

#### H.S.2

8 butts	BB1199 32D	
1 lock (active door)	ND60PD	(Schlage)
1 lock guard (active door)	LG12	(Ives)
2 surface bolts	SB453, 12" long	(Ives)
1 removable mullion	KR1654 (less strikes)	(Von Duprin)
1 keyed removable mullion lock cylinder and collar		(Schlage)
2 closers	P4041 Spring HCush	(LCN)
2 kickplates	190S, 12 inch	(Hager)
1 threshold	425	
2 jamb seals	A626A	
2 sweeps	C607A	

#### H.S.3

3 butts	BB1199	(Hager)
1 lock	ND10S	(Schlage)
1 kickplate	190S, 12 inch	(Hager)
1 wall stop	9212T	(Hiawatha)

NOTES:

1. Lock type design as follows, unless noted otherwise:
  - a. Schlage ND Series, Rhodes.
  - b. Cylinders shall be master keyed to owner's requirements.
2. Finishes:
  - a. US26D/32D, unless noted otherwise.
  - b. Closers sprayed aluminum, unless noted otherwise.
  - c. Threshold: Mill.
3. Hinge Size: 4½ inch by 4½ inch, unless noted otherwise.

END OF SECTION

## SECTION 08800

### GLAZING

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Glass and glazing for windows.

##### 1.02 RELATED SECTIONS

- A. Section 08520 - Aluminum Windows.

##### 1.03 REFERENCES

- A. American National Standards Institute (ANSI):
  - 1. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.
- B. American Society of Civil Engineers (ASCE):
  - 1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- C. American Society for Testing and Materials (ASTM):
  - 1. ASTM C570 - Standard Specification for Oil- and Resin-Base Caulking Compound for Building Construction.
  - 2. ASTM C669 - Standard Specification for Glazing Compounds for Back Bedding and Face Glazing of Metal Sash.
  - 3. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
  - 4. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
  - 5. ASTM C1036 - Standard Specification for Flat Glass.
  - 6. ASTM C1048 - Standard Specification for Heat-Treated Flat Glass - Kind HS, Kind FT Coated and Uncoated Glass.
  - 7. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
  - 8. ASTM C1193 - Standard Guide for Use of Joint Sealants.
  - 9. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors By Uniform Static Air Pressure Difference.
  - 10. ASTM E546 - Test Method For Frost Point of Sealed Insulating Glass Units.
  - 11. ASTM E576 - Test Method For Dew/Frost Point of Sealed Insulating Glass Units in Vertical Position.
  - 12. ASTM E773 - Standard Test Methods for Seal Durability of Sealed Insulating Glass Units.
  - 13. ASTM E774 - Standard Specification for Sealed Insulating Glass Units.

14. ASTM E1425 - Standard Practice for Determining the Acoustical Performance of Exterior Windows and Doors.

- D. Glass Association of North America (GANA):
  1. GANA - FGMA - Sealant Manual.
  2. GANA - Glazing Manual.

#### 1.04 SUBMITTALS

- A. Submit samples of glass.
- B. Submit warranty.
- C. Manufacturer's Certificate: Certify sealed insulated glass, meets or exceeds specified requirements.

#### 1.05 QUALITY ASSURANCE

- A. Perform Work in accordance to GANA Glazing Manual, GANA Sealant Manual, SIGMA and Laminators Safety Glass Association Standards Manual for glazing installation methods.

#### 1.06 QUALIFICATIONS

- A. Installer: Company specializing in performing Work of this section with minimum three (3) years experience.

#### 1.07 ENVIRONMENTAL REQUIREMENTS

- A. Do not install glazing when ambient temperature is less than 50 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

#### 1.08 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on drawings.

#### 1.09 COORDINATION

- A. Coordinate the Work with glazing frames, wall openings, and perimeter air and vapor seal to adjacent Work.

#### 1.10 WARRANTY

- A. Section 01700 - Execution Requirements: Warranty provisions.

- B. Manufacturer's Warranty:
  - 1. Furnish 10 year warranty, include coverage for sealed glass units from seal failure, interpane dusting or misting, and replacement of same.
  - 2. Furnish 10 year warranty to include coverage for delamination of laminated glass and replacement of same.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Glass:
  - 1. Cardinal IG.
  - 2. Libby-Owens-Ford.
  - 3. Pilkington.
  - 4. PPG.
  - 5. Viracon.
- B. Insulated Unit Fabricator
  - 1. Custom Glass Product.
  - 2. HGP.
  - 3. Old Castle Glass.

### 2.02 GLASS MATERIALS

- A. Type A: Insulated unit, double pane, 3/16-inch safety glass panes, low-E, aluminum spacer, dual seal, total unit thickness of 1 inch. One pane of the unit shall be obscure frosted, etched, blasted, or ground glass. The obscure face shall be located inside the sealed unit.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that openings for glazing are correctly sized and within acceptable tolerance.
- B. Verify surfaces of glazing channels or recesses are clean, free of obstructions impeding moisture movement, weeps are clear, and ready to receive glazing.
- C. Beginning of installation means acceptance of substrates.

### 3.02 PREPARATION

- A. Clean contact surfaces with solvent and wipe dry.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

- C. Prime surfaces in accordance to manufacturer's instructions.

### 3.03 INSTALLATION

- A. Perform installation in accordance to GANA Glazing Manual.
  - 1. Glazing Sealants: Comply with ASTM C1193.
- B. Install in accordance to glazing and frames manufacturer's instructions.
- C. Exterior Wet/Dry Method (Preformed Tape and Sealant) Installation:
  - 1. The sealant used must be compatible with glazing tape compound.
  - 2. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with compatible butyl sealant.
  - 3. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete continuity of air and vapor seal.
  - 4. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
  - 5. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.
  - 6. Install removable stops, with spacer strips inserted between glazing and applied stops, 1/4 inch below sight line.
  - 7. Fill gap between glazing and stop with elastomeric glazing sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.
  - 8. Apply cap bead of elastomeric glazing sealant along void between stop and glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

### 3.04 CLEANING

- A. Remove glazing materials from finish surfaces.
- B. Remove labels from glass after work is complete.
- C. Clean glass and adjacent surfaces.

### 3.05 PROTECTION OF FINISHED WORK

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste.

END OF SECTION

## DIVISION 9 - FINISHES

### SECTION 09670

#### FLUID-APPLIED FLOORING

##### PART 1 GENERAL

###### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

###### 1.02 SUMMARY

- A. This section includes the following:
  - 1. Resinous flooring system as shown on the drawings and in schedules.
- B. Related sections include the following:
  - 1. Cast-in-Place Concrete, division 3

###### 1.03 SYSTEM DESCRIPTION

- A. The work shall consist of preparation of the substrate, the furnishing and application of an epoxy based multi roller applied flooring system with Q 28 colored quartz aggregate and urethane topcoat. The system shall have a nominal thickness of 1/8 inch. It shall be applied to the prepared areas as defined in the plans strictly in accordance to the Manufacturer's recommendations.
- B. Cove base to be applied where noted on plans and per manufacturers standard details unless otherwise noted.

###### 1.04 SUBMITTALS

- A. Product Data: Latest edition of Manufacturer's literature including performance data and installation procedures.
- B. Manufacturer's Material Safety Data Sheet (MSDS) for each product being used.
- C. Samples: A 6 inch square sample of the proposed system. Color, texture, and thickness shall be representative of overall appearance of finished system.

###### 1.05 QUALITY ASSURANCE

- A. The Manufacturer shall have a minimum of 8 years' experience in the production, sales, and technical support of epoxy and urethane industrial flooring and related materials.

- B. The Applicator shall have been approved by the flooring system manufacturer in all phases of surface preparation and application of the product specified.
- C. No requests for substitutions shall be considered that would change the generic type of the specified system.
- D. A pre-installation conference shall be held between applicator, general contractor and the owner to review and clarification of this specification, application procedure, quality control, inspection and acceptance criteria and production schedule.

#### 1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Packing and Shipping
  - 1. All components of the system shall be delivered to the site in the Manufacturer's packaging, clearly identified with the product type and batch number.
- B. Storage and Protection
  - 1. The Applicator shall be provided with a storage area for all components. The area shall be between 60 F and 90 F, dry, out of direct sunlight and in accordance to the Manufacturer's recommendations and relevant health and safety regulations.
  - 2. Copies of Material Safety Data Sheets (MSDS) for all components shall be kept on site for review by the engineer or other personnel.
- C. Waste Disposal
  - 1. The Applicator shall be provided with adequate disposal facilities for non-hazardous waste generated during installation of the system.

#### 1.07 PROJECT CONDITIONS

- A. Site Requirements
  - 1. Application may proceed while air, material and substrate temperatures are between 60 F and 90 F providing the substrate temperature is above the dew point. Outside of this range, the manufacturer shall be consulted.
  - 2. The relative humidity in the specific location of the application shall be less than 85 % and the surface temperature shall be at least 5 F above the dew point.
  - 3. The Applicator shall ensure that adequate ventilation is available for the work area.
  - 4. The Applicator shall be supplied with adequate lighting equal to the final lighting level during the preparation and installation of the system.
- B. Conditions of new concrete to be coated with epoxy material.
  - 1. Concrete shall be moisture cured for a minimum of 7 days and have fully cured a minimum of 30 days prior to the application of the coating system pending moisture tests.



2. Concrete shall have a flat rubbed finish, float or light steel trowel finish (a hard steel trowel finish is neither necessary nor desirable).
  3. Sealers and curing agents should not be used.
  4. Concrete surfaces on grade shall have been constructed with a vapor barrier to protect against the effects of vapor transmission and possible delamination of the system.
- C. Safety Requirements
1. All open flames and spark-producing equipment shall be removed from the work area prior to commencement of application.
  2. "No Smoking" signs shall be posted at the entrances to the work area.
  3. The owner shall be responsible for the removal of foodstuffs from the work area.
  4. Non-related personnel in the work area shall be kept to a minimum.

## 1.08 WARRANTY

- A. A warranty for a period of not less than one (1) year from the date of the projects substantial completion. Manufacturer shall provide a material warranty and the installer a will provide a warranty on workmanship.

## PART 2 PRODUCTS

### 2.01 MANUFACTURER

- A. Dur-A-Flex, 95 Goodwin Street, East Hartford, CT 06108, Phone: (860) 528-9838, Fax: (860) 528-2802, [dur-a-flex.com](http://dur-a-flex.com).
- B. General Polymers Corporation, a division of Sherwin Williams, [www.sherwin-williams.com/im](http://www.sherwin-williams.com/im), (800) 524-5979.

### 2.02 PRODUCTS

- A. Dur-A-Flex, Inc, Dur-A-Quartz, Epoxy-Based seamless flooring system with urethane topcoat.
1. System Materials:
    - a. Primer: Dur-A-Flex, Inc, Dur-A-Shield #2 resin and hardener.
    - b. Broadcast Coats: Dur-A-Flex, Inc, Dur-A-Glaze #4 resin and hardener.
    - c. The quartz aggregate shall be Dur-A-Flex, Inc. Q-28 colored quartz aggregate.
    - d. Grout coat: Dur-A-Flex, Inc. Dur-A-Glaze #4 resin and Water Clear hardener.
    - e. Topcoat: Dur-A-Flex, Inc. Armor Top resin and hardener.
  2. Patch Materials
    - a. Shallow Fill and Patching: Use Dur-A-Flex, Inc. Dur-A-Glaze # 4 Cove-Rez.

- b. Deep Fill and Sloping Material (over ¼ inch): Use Dur-A-Flex, Inc. Dur-A-Crete.
  - 3. Joint Sealant: Type recommended or produced by resinous flooring manufacturer and recommended by manufacturer.
- B. Sherwin Williams, General Polymers 1/8-inch Ceramic Carpet system.
  - 1. Primer: 3579.
  - 2. First Broadcast: 3561/5900F.
  - 3. Second Broadcast: 5900F.
  - 4. Grout Coat: 3745.
  - 5. Seal Coat: 3745.
- C. Color, design based on Ceramic Carpet: Bramble.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Examine substrates, areas and conditions, with Applicator present, for compliance with requirements for maximum moisture content, installation tolerances and other conditions affecting flooring performance.
  - 1. Verify that substrates and conditions are satisfactory for flooring installation and comply with requirements specified.

### 3.02 PREPARATION

- A. General
  - 1. New and existing concrete surfaces shall be free of oil, grease, curing compounds, loose particles, moss, algae growth, laitance, friable matter, dirt, and bituminous products.
  - 2. Moisture Testing: Perform anhydrous calcium chloride test ASTM F 1869-98.
    - a. Perform three tests for the first 1,000 sf and then one test per 1,000 sf after that.
    - b. Application will proceed only when the vapor/moisture emission rates from the slab is less than and not higher than 3 lbs/1,000 sf/24 hrs.
    - c. If the vapor drive exceeds 3 lbs/1,000 sf/24 hrs then the owner and/or engineer shall be notified and advised of additional cost for the possible installation of a vapor mitigation system that has been approved by the manufacturer or other means to lower the value to the acceptable limit.
  - 3. There shall be no visible moisture present on the surface at the time of application of the system. Compressed oil-free air and/or a light passing of a propane torch may be used to dry the substrate.

4. Mechanical surface preparation.
  - a. Shot blast all surfaces to receive flooring system with a mobile steel shot, dust recycling machine (Blastrac or equal). All surface and embedded accumulations of paint, toppings hardened concrete layers, laitance, power trowel finishes and other similar surface characteristics shall be completely removed leaving a bare concrete surface having a minimum profile of CSP 4-5 as described by the International Concrete Repair Institute.
  - b. Floor areas inaccessible to the mobile blast machines shall be mechanically abraded to the same degree of cleanliness, soundness and profile using diamond grinders, needle guns, bush hammers, or other suitable equipment.
  - c. Where the perimeter of the substrate to be coated is not adjacent to a wall or curb, a minimum 1/4 inch key cut shall be made to properly seat the system, providing a smooth transition between areas. The detail cut shall also apply to drain perimeters and expansion joint edges.
  - d. Cracks and joints (non-moving) greater than 1/8 inch wide are to be chiseled or chipped-out and repaired per manufacturer's recommendations.

### 3.03 APPLICATION

#### A. General

1. The system shall be applied in six distinct steps as listed below:
  - a. Substrate preparation
  - b. Priming
  - c. First broadcast coat application with first aggregate broadcast
  - d. Second broadcast coat with second aggregate broadcast
  - e. Grout coat application, sand floor (if required)
  - f. Topcoat application
2. Immediately prior to the application of any component of the system, the surface shall be dry and any remaining dust or loose particles shall be removed using a vacuum or clean, dry, oil-free compressed air.
3. The handling, mixing and addition of components shall be performed in a safe manner to achieve the desired results in accordance to the manufacturer's recommendations.
4. The system shall follow the contour of the substrate unless pitching or other leveling work has been specified by the architect.
5. A neat finish with well-defined boundaries and straight edges shall be provided by the applicator.

#### B. Primer

1. The primer shall consist of a liquid resin and hardener that is mixed at the ratio of 2 parts resin to 1 part hardener per the manufacturer's instructions.
2. The primer shall be applied by flat squeegee and back rolled at the rate of 200-250 sf/gal to yield a dry film thickness of 6 mils.

C. Broadcast Coat

1. The broadcast coat shall be applied as a double broadcast system.
2. The broadcast coat shall be comprised of two components, a resin, and hardener as supplied by the Manufacturer and mixed in the ratio of 2 parts resin to 1 part hardener.
3. The resin shall be added to the hardener and thoroughly mixed by suitably approved mechanical means.
4. The broadcast coat shall be applied over horizontal surfaces using “v” notched squeegee and back rolled at the rate of 90-100 sf/gal.
5. Colored quartz aggregate shall be broadcast to excess into the wet material at the rate of 0.5 lbs/sf.
6. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.
7. Apply a second coat of resin with a coverage rate of 90-100 sf/gal and broadcast aggregate to excess at the rate of 0.5 lbs/sf.
8. Allow material to fully cure. Vacuum, sweep and/or blow to remove all loose aggregate.

D. Grout Coat

1. The grout coat shall be comprised of a liquid resin and a liquid hardener that is mixed in the ratio of 1 part hardener to 2 parts resin and installed per the manufacturer’s recommendations.
2. The grout coat shall be squeegee applied and back rolled with a coverage rate of 90-100 sf/gal.

E. Topcoat

1. A topcoat shall be roller applied at the rate of 500 square feet per gallon, to yield a dry film thickness of 3 mils.
2. The topcoat shall be comprised of a liquid resin, hardener and grit that is mixed per the manufacturer’s instructions.
3. The finish floor will have a nominal thickness of 1/8 inch.

3.04 FIELD QUALITY CONTROL

A. Tests, Inspection

1. The following tests shall be conducted by the Applicator:
  - a. Temperature
    - 1) Air, substrate temperatures and, if applicable, dew point.
  - b. Coverage Rates
    - 1) Rates for all layers shall be monitored by checking quantity of material used against the area covered.

### 3.05 CLEANING AND PROTECTION

- A. Cure flooring material in compliance with manufacturer's directions, taking care to prevent their contamination during stages of application and prior to completion of the curing process.
- B. Remove masking. Perform detail cleaning at floor termination, to leave cleanable surface for subsequent work of other sections.

END OF SECTION

## SECTION 09900

### PAINTING

#### PART 1 GENERAL

##### 1.01 WORK INCLUDED

- A. Surface preparation.
- B. Surface finish.

##### 1.02 RELATED WORK

- A. Divisions 15 and 16 - Mechanical and Electrical Identification.

##### 1.03 REFERENCES

- A. ANSI/ASTM D16 - Definitions of Terms Relating to Paint, Varnish, Lacquer, and Related Products.

##### 1.04 DEFINITIONS

- A. Conform to ANSI/ASTM D16 for interpretation of terms used in this Section.

##### 1.05 QUALITY ASSURANCE

- A. Product Manufacturer: Company specializing in manufacturing quality paint and finish products with three years experience.
- B. Applicator: Company specializing in commercial painting and finishing with three years documented experience.

##### 1.06 REGULATORY REQUIREMENTS

- A. Conform to State of Wisconsin DSPS Building Code for flame/fuel/smoke rating requirements for finishes.

##### 1.07 SUBMITTALS

- A. Submit product data and samples under provisions of Section 01330.
- B. Submit samples illustrating range of colors available for each surface finishing product scheduled, for selection.
- C. Submit manufacturer's application instructions under provisions of Section 01330.

- D. Provide five copies of a schedule detailing each substrate in the same order as the schedules used in Part 3 of this section. Include the following:
1. The specific products to be used for each coat.
  2. Documentation that the manufacturer has reviewed and approved each painting system.
  3. Data pages for all products listed.
  4. On one set of data pages, highlight the following:
    - a. Type of Resin
    - b. Dry Film Thickness
    - c. Volume Solids
    - d. Units of Sheen
    - e. Other performance or descriptive data required by Part 2 of this section.
    - f. If this information is not on the data page, provide the information in a letter of certification from the manufacturer. Attach the letter to the appropriate data page.
- E. Submit one drawdown of each product and color combination. Drawdowns shall be applied using a 4 mil WFT drawdown bar on Leneta form WD plain white coated cards size 3-7/8" x 6".
1. Label each card with the following:
    - a. Job Name
    - b. Date
    - c. Product Name
    - d. Product Number
    - e. Color number as stated in the color schedule
    - f. Name, address, and phone number of the supplying facility

#### 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptance.
- B. Container labeling to include manufacturer's name, type of paint, brand name, brand code, coverage, surface preparation, drying time, cleanup, color designation, and instructions for mixing and reducing.
- C. Store paint materials at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in well ventilated area, unless required otherwise by manufacturer's instructions.
- D. Take precautionary measures to prevent fire hazards and spontaneous combustion.

## 1.09 ENVIRONMENTAL REQUIREMENTS

- A. Provide continuous ventilation and heating facilities to maintain surface and ambient temperatures above 50 degrees F for 24 hours before, during, and 48 hours after application of finishes, unless required otherwise by manufacturer's instructions.
- B. Do not apply exterior coatings during rain or snow, or when relative humidity is above 50 percent, unless required otherwise by manufacturer's instructions.
- C. Minimum Application Temperatures for Latex Paints: 50 degrees F (7 degrees C) for interiors; 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions.
- D. Minimum Application Temperature for Varnish and Stain Finishes: 65 degrees F (18 degrees C) for interior or exterior, unless required otherwise by manufacturer's instructions.

## 1.10 EXTRA STOCK

- A. Provide one unopened gallon container of each color, type, and finish to owner.
- B. Label each container with color, texture, and room locations in addition to the manufacturer's label.

## PART 2 PRODUCTS

### 2.01 ACCEPTABLE MANUFACTURERS - PAINT, PRIMERS, SEALERS, BLOCK FILLER

- A. Sherwin Williams.
- B. Other Acceptable Manufacturers: Pratt & Lambert and Mautz.

### 2.02 ACCEPTABLE MANUFACTURERS - URETHANE AND STAIN

- A. Sherwin Williams.
- B. Minwax.
- C. Substitutions: Under provisions of Section 01600.

### 2.03 ACCEPTABLE MANUFACTURERS - EPOXY PAINT

- A. Sherwin Williams.
- B. No substitutions.



## 2.04 MATERIALS

- A. Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating.
- B. Coatings: Good flow and brushing properties; capable of drying or curing free of streaks or sags.
- C. Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.

## 2.05 FINISHES

- A. Refer to schedule at end of section for surface finish. Colors shall be selected by Architect.
- B. See plans and specifications for items to receive finishes.

## PART 3 EXECUTION

### 3.01 INSPECTION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
  - 1. Plaster and Gypsum Wallboard: 12 percent.
  - 2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
  - 3. Interior Located Wood: 15 percent, measured in accordance to ASTM D2016.
  - 4. Exterior Located Wood: 15 percent, measured in accordance to ASTM D2016.
- D. Beginning of installation means acceptance of substrate.

### 3.02 PREPARATION

- A. Remove electrical plates, hardware, light fixture trim, and fittings prior to preparing surfaces or finishing.
- B. Correct minor defects and clean surfaces which affect work of this Section.

- C. Shellac and seal marks which may bleed through surface finishes.
- D. Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- E. Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- F. Asphalt, Creosote, or Bituminous Surfaces Scheduled for Paint Finish: Remove foreign particles to permit adhesion of finishing materials. Apply latex based compatible sealer or primer.
- G. Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- H. Copper Surfaces Scheduled for a Paint Finish: Remove contamination by steam, high pressure water, or solvent washing. Apply vinyl etch primer immediately following cleaning.
- I. Copper Surfaces Scheduled for a Natural Oxidized Finish: Remove contamination by applying oxidizing solution of copper acetate and ammonium chloride in acetic acid. Rub on repeatedly for required effect. Once attained, rinse surfaces with clear water and allow to dry.
- J. Gypsum Board Surfaces: Latex fill minor defects. Spot prime defects after repair.
- K. Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- L. Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- M. Uncoated Steel and Iron Surfaces: Remove grease, scale, dirt, and rust. Where heavy coatings of scale are evident, remove by wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- N. Shop Primed Steel Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Prime metal items including shop primed items.
- O. Interior Wood Items Scheduled to Receive Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.

- P. Exterior Wood Scheduled to Receive Paint Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied.
- Q. Metal Doors Scheduled for Painting: Seal top and bottom edges with primer.

### 3.03 PROTECTION

- A. Protect elements surrounding the work of this section from damage or disfiguration.
- B. Repair damage to other surfaces caused by work of this Section.
- C. Furnish drop cloths, shields, and protective methods to prevent spray or droppings from disfiguring other surfaces.
- D. Remove empty paint containers from site.

### 3.04 APPLICATION

- A. Apply products in accordance to manufacturer's instructions.
- B. Do not apply finishes to surfaces that are not dry.
- C. Apply each coat to uniform finish.
- D. Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- E. Sand lightly between coats to achieve required finish.
- F. Allow applied coat to dry before next coat is applied.
- G. Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- H. Prime back surfaces of interior and exterior woodwork with primer paint.
- I. Prime back surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25 percent with mineral spirits.

### 3.05 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- A. Divisions 15 and 16 are responsible for color coding and identification banding of equipment, ductwork, piping, and conduit.
- B. Paint shop primed equipment.

- C. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- D. Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are prefinished at locations where adjacent surface is scheduled to be painted.
- E. Replace identification markings on mechanical or electrical equipment when painted accidentally.
- F. Painting of interior surfaces of air ducts, and convector and baseboard heating cabinets that are visible through grilles and louvers shall be by Divisions 15 and 16.
- G. Paint exposed conduit and electrical equipment occurring in finished areas.
- H. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.
- I. Replace electrical plates, hardware, light fixture trim, and fittings removed prior to finishing.

### 3.06 CLEANING

- A. As Work proceeds, promptly remove paint where spilled, splashed, or spattered.
- B. During progress of Work maintain premises free of unnecessary accumulation of tools, equipment, surplus materials, and debris.
- C. Collect cotton waste, cloths, and material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

### 3.07 SCHEDULE - SHOP PRIMED ITEMS FOR SITE FINISHING

- A. Metal Fabrications (Section 05500): Interior and exterior exposed surfaces of lintels and guard posts.
- B. All hollow metal doors and hollow metal frames.
- C. Reference drawings for additional miscellaneous items to be field painted.

### 3.08 EXTERIOR PAINT SCHEDULE:

- A. Zinc-coated Metal - doors, frames, and lintels:
  - Touch-up: Rust-inhibitive waterborne acrylic primer, free of heavy metals
  - DFT: 2.5-5.0 mils
  - Min. Volume Solids: 44%
  - 1. S-W DTM Acrylic Primer/Finish B66WW10
  - 2nd Coat: Non-blocking, 100% acrylic gloss coating

3rd Coat: Non-blocking, 100% acrylic gloss coating

Min. DFT: 1.3 mils per coat

Min. Volume Solids: 31%

Sheen: 70-90 units @ 60 degrees

1. S-W Exterior Super Paint High Gloss Door and Trim Enamel A85 series

### 3.09 INTERIOR PAINT SCHEDULE:

#### A. Wood - transparent finish:

1st Coat: VOC compliant wiping stain

Spreading Rate: as needed to match architect's sample

1. S-W Wood Classics Interior Oil Stain A48\_200 series (S64 in CA and AZ)

2nd Coat: Polyurethane satin varnish

3rd Coat: Polyurethane satin varnish

Min. DFT: 1.7 mils per coat

Min. Volume Solids: 41%

Sheen: 20-35 units @ 60 degrees

1. S-W Wood Classics Polyurethane Varnish A67F1

#### B. Wood – painted:

1st Coat: 100% acrylic primer

Min. DFT: 1.6 mils

Min. Volume Solids: 39%

1. S-W Premium Interior Wall and Wood Latex Primer B28W8111
2. PPG Speedhide Interior Latex Enamel Undercoater 6-855. 7

2nd Coat: Non-blocking, acrylic, semi-gloss

3rd Coat: Non-blocking, acrylic, semi-gloss

Pencil Hardness (ASTM D3363): H or harder

Min DFT: 1.3 mils per coat

Min. Volume Solids: 33%

Sheen: 35-45 units @ 60 degrees

1. S-W ProClassic Waterborne Interior Acrylic Semi-gloss B31W20 series
2. PPG Int/Ext Semi-Gloss Acrylic Metal Finish 7-374 Series

#### C. Zinc-coated metal:

1st Coat: Rust-inhibitive waterborne acrylic primer, free of heavy metals

DFT: 2.5-5.0 mils

Min. Volume Solids: 44%

1. S-W DTM Acrylic Primer/Finish B66WW10

2nd Coat: Non-blocking, acrylic, semi-gloss

3rd Coat: Non-blocking, acrylic, semi-gloss

Pencil Hardness (ASTM D3363): H or harder

Min. DFT: 1.3 mils per coat

Min. Volume Solids: 33%

Sheen: 35-45 units @ 60 degrees

1. S-W ProClassic Waterborne Interior Acrylic Semi-gloss B31W20 series

D. Concrete Masonry Units:

1st Coat: 100% acrylic blockfiller

Min. DFT: 10.0 mils (50-90 sq. ft./gal)

Min. Volume Solids: 53.5%

1. S-W Heavy Duty Blockfiller B42W46

2nd Coat: 2-component waterbased catalyzed epoxy

3rd Coat: 2-component waterbased catalyzed epoxy

DFT: 2.5-3.0 mils per coat

Min. Volume Solids: 38% (catalyzed)

Sheen: 20-30 units @ 60 degrees

1. S-W Water Based Catalyzed Epoxy B70 series/B60V25

### 3.10 MISCELLANEOUS PAINT SCHEDULE

- A. For items that require finish and no specific paint system is identified, provide manufacturer recommended paint system for the given application.

### 3.11 COLOR SCHEDULE

- A. Exterior Door: Frame; Color match Rollex Evergreen
- B. Interior Door: Frame; Color match Rollex Evergreen
- C. Interior Walls: Plumbing Wall; Sherwin Williams SW 7739 Herbal Wash
- D. Interior Walls, all others: Sherwin Williams SW 7518 Beach House
- E. Painted Ceiling and Trim: Sherwin Williams SW 7518 Beach House
- F. Stain Ceiling and Trim: Sherwin Williams SW 3123-P Oak Mantel
- G. Painted letters and stripes on column: Color match Rollex Evergreen
- H. Painted Letters and Symbol on Doors: Sherwin Williams SW 7518 Beach House

END OF SECTION

## DIVISION 10 - SPECIALTIES

### SECTION 10170

#### PLASTIC TOILET COMPARTMENTS

##### PART 1 GENERAL

###### 1.01 WORK INCLUDED

- A. Toilet Compartments.

###### 1.02 REFERENCES

- A. National Fire Protection Associates 101 Life Safety Code 1991 Edition. Chapters 5, 6, 8-30.

###### 1.03 SUBMITTALS

- A. Submit shop drawings and product data.
- B. Manufacturer's Data
  - 1. Provide product data sheets, installation instructions, replacement parts information, color selection samples.
- C. Shop Drawings
  - 1. Provide required number of copies of all shop drawings.
  - 2. Show fabrication and erection of compartment assemblies, to extent not fully described by manufacturer's data sheets.
  - 3. Show anchorage, accessory items and finishes.
  - 4. Provide location drawings for bolt hole locations in supporting members for attachment of compartments.

###### 1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver items in manufacturer's original unopened protective packaging.
- B. Store materials in original protective packaging to prevent physical damage or wetting.
- C. Handle so as to prevent damage to finished surfaces.

###### 1.05 WARRANTY

- A. Furnish 10 year limited manufacturer's warranty for panels, doors, and stiles against breakage, corrosion, delamination, and defects in factory workmanship.
- B. Furnish one year guarantee against defects in material and workmanship for stainless steel door hardware and mounting brackets.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

- A. Bradley Corp, [www.bradleycorp.com](http://www.bradleycorp.com).
- B. General Partitions, [www.generalpartitions.com](http://www.generalpartitions.com).
- C. Scranton Products, Santana-Comtec, [www.scrantonproducts.com](http://www.scrantonproducts.com).

### 2.02 PRODUCTS

- A. System Description
  - 1. Compartment Configurations:
    - a. Toilet partitions: Floor mounted, overhead braced.
  - 2. Solid Plastic Panels: Maximum flame spread/smoke developed rating of 75/450, tested to ASTM E84.

### 2.03 MATERIALS

- A. Doors, Panels and Pilasters:
  - 1. High density polyethylene (HDPE), fabricated from polymer resins compounded under high pressure, forming single thickness panel.
  - 2. Waterproof and nonabsorbent, with self-lubricating surface, resistant to marks by pens, pencils, markers, and other writing instruments.
  - 3. 1 inch thick with edges rounded to 1/4 inch radius.
  - 4. Color; design based on general partitions: 262 Latte.
- B. Aluminum Extrusions: ASTM B221, 6463-T5 alloy and temper.
- C. Stainless Steel: ASTM A167, Type 304.

### 2.04 HARDWARE

- A. Hinges: Stealth integral hinge from door and pilaster material with exposed metal parts on interior of stall.
- B. Door Strike and Keeper:
  - 1. 6 inches long, fabricate from heavy-duty extruded aluminum with bright dip anodized finish, with wrap-around flanges secured to pilasters with stainless steel tamper resistant Torx head sex bolts.
  - 2. Bumper: Extruded black vinyl.
- C. Latch and Housing:
  - 1. Heavy-duty extruded aluminum.
  - 2. Latch housing: Bright dip anodized finish.



- D. Coat Hook/Bumper:
  - 1. Combination type, chrome plated Zamak.
  - 2. Equip outswing handicapped doors with second door pull and door stop.
- E. Door Pulls: Chrome plated Zamak.

## 2.05 COMPONENTS

- A. Doors and Dividing Panels: 55 inches high, mounted 14 inches above finished floor.
- B. Pilasters: 82 inches high, fastened to pilaster sleeves with stainless steel tamper resistant Torx head sex bolt.
- C. Pilaster Sleeves: 3 inches high, 20 gage stainless steel, secured to pilaster with stainless steel tamper resistant Torx head sex bolt.
- D. Wall Brackets: 54 inches long, heavy-duty aluminum, bright dip anodized finish, fastened to pilasters and panels with stainless steel tamper resistant Torx head sex bolts.
- E. Headrail: Heavy-duty extruded aluminum, anti-grip design, clear anodized finish, fastened to headrail bracket with stainless steel tamper resistant Torx head sex bolt and at top of pilaster with stainless steel tamper resistant Torx head screws.
- F. Headrail Brackets: 20 gage stainless steel, satin finish, secured to wall with stainless steel tamper resistant Torx head screws.

## PART 3 EXECUTION

### 3.01 INSPECTION

- A. Check areas scheduled to receive compartments for correct dimensions, plumbness of walls, and soundness of surfaces that would affect installation of mounting brackets.
- B. Verify spacing of plumbing fixtures to assure compatibility with installation of compartments.
- C. Do not begin installation of compartments until conditions are satisfactory.

### 3.02 ERECTION

- A. Install compartments rigidly, straight, plumb, and level and in accordance to manufacturer's installation instructions.
- B. Installation methods shall conform to manufacturer's recommendations for backing and proper support.

- C. Conceal evidence of drilling, cutting, and fitting to room finish.
- D. Maintain uniform clearance at vertical edge of doors.

### 3.03 ADJUSTMENT AND CLEANING

- A. Adjust hardware for proper operation after installation.
- B. Set hinges on in-swinging doors to hold doors open approximately 15 degrees from closed position when unlatched.
- C. Set hinges on out-swinging doors to hold unlatched doors in closed position.
- D. Clean exposed surfaces of partitions, hardware, and fittings.

END OF SECTION

## SECTION 10400

### IDENTIFYING DEVICES

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Toilet Room Accessible Signs.

##### 1.02 SUBMITTALS

- A. Shop Drawings: Indicate sign styles, lettering, font, foreground and background colors, locations, and overall dimensions of each sign.
- B. Manufacturer's Installation Instructions: Submit installation attachment devices.

##### 1.03 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum 3 years' documented experience.

##### 1.04 DELIVERY, STORAGE, AND HANDLING

- A. Package letters and signs, labeled in name groups.

##### 1.05 ENVIRONMENTAL REQUIREMENTS

- A. Do not install signs when ambient temperature is lower than recommended by manufacturer.
- B. Maintain this minimum temperature during and after installation of signs.

#### PART 2 PRODUCTS

##### 2.01 COMPONENTS

- A. Toilet Room Accessible Signage: One-piece solid photo etched zinc sign, 0.125-inch thick with minimum 1/32 inch raised tactile symbols and letter accompanies with Grade 2 Braille, raised perimeter border, square corners. Model PEZADARN as manufactured by Sign Source, (928) 708-0755, [www.signsourceinaz.com](http://www.signsourceinaz.com), or equal by Advance Corporation, (800) 328-9451.
  - 1. Women's toilet room: 8"x8" size, "WOMEN" text with woman symbol.
  - 2. Men's toilet room: 8"x8" size, "MEN" text with man symbol.
  - 3. Font: Optima bold.
  - 4. Mounting: Sign shall be mounted with concealed posts.

5. Colors:
  - a. Sign background shall be matte finish in color selected from manufacturer's full range of colors. Design based on Sign Source Brown (dark brown).
  - b. Borders and graphics shall be non-glare, matte in natural aluminum color.

### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means acceptance of substrate.

#### 3.02 INSTALLATION

- A. Install in accordance to manufacturer's instructions.
- B. Install signs after substrate is finished, in locations indicated.
- C. Mount all room signage at 60 inches above finished floor to center of sign.
- D. Mount room signage on wall adjacent to latch side of door, unless noted otherwise.
- E. Mount to wall with exterior grade adhesive recommended by manufacturer.

#### 3.03 CLEANING

- A. Clean signs per manufacturer's instructions.

END OF SECTION

## SECTION 10520

### FIRE EXTINGUISHERS AND ACCESSORIES

#### PART 1 GENERAL

##### 1.01 WORK INCLUDED

- A. Fire extinguishers.
- B. Accessories.

##### 1.02 REFERENCES

- A. National Fire Protection Association (NFPA):
  - 1. NFPA 10 - Standard for Portable Fire Extinguishers.
  - 2. NFPA 17 - Dry Chemical Fire.
- B. Underwriter's Laboratories Inc. (UL):
  - 1. Fire Protection Equipment Directory.

##### 1.03 PERFORMANCE REQUIREMENTS

- A. Conform to NFPA 10 requirements for extinguishers.
- B. Furnish extinguishers classified and labeled by Underwriters Laboratories Inc. for purpose specified and indicated.

##### 1.04 SUBMITTALS

- A. Product Data: Submit extinguisher, operational features, color and finish, and anchorage details.

##### 1.05 OPERATION AND MAINTENANCE DATA

- A. Operation and Maintenance Data: Submit test, refill or recharge schedules, procedures, and re-certification requirements, including requirements applicable to the Work.

##### 1.06 ENVIRONMENTAL REQUIREMENTS

- A. Do not install extinguishers when ambient temperatures are capable of freezing extinguisher ingredients.

## PART 2 PRODUCTS

### 2.01 ACCEPTABLE MANUFACTURERS

- A. Amerex.
- B. J.L. Industries.
- C. Larsens Manufacturing Company.

### 2.02 EXTINGUISHERS

- A. Ten pound Model MP10, Larsen's. UL Rating: 4A-60B:C.
- B. Wall Bracket: Shall support bottom of extinguisher.

### 2.03 FINISHES

- A. Extinguisher: Red enamel.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Beginning of installation means acceptance of existing conditions.

### 3.02 INSTALLATION

- A. Install wall bracket so that top of extinguisher is 48 inches above the finished floor.
- B. Secure rigidly in place in accordance to manufacturer's instructions.

END OF SECTION

## SECTION 10800

### TOILET AND BATH ACCESSORIES

#### PART 1 GENERAL

##### 1.01 SECTION INCLUDES

- A. Toilet and washroom accessories.
- B. Attachment hardware.

##### 1.02 REFERENCES

- A. Americans with Disabilities Act (ADA) of 1990, Accessibilities Guidelines for Buildings and Facilities, 2010 revision.
- B. American Society of Testing and Materials (ASTM):
  - 1. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - 2. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
  - 3. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 4. ASTM A666 - Standard Specification for Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
  - 5. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
  - 6. ASTM C1036 - Standard Specification for Flat Glass.
- C. Federal Specification Unit (FS):
  - 1. FS A-A-3002 - Mirrors, Glass.
- D. International Code Council:
  - 1. IBC - International Building Code, 2009 edition, with all referenced standards and State of Wisconsin amendment.

##### 1.03 SUBMITTALS

- A. Product Data: Submit product data on accessories describing size, finish, details of function, and attachment methods.
- B. Manufacturer's Installation Instruction: Submit special procedures and conditionings requiring special attention.

#### 1.04 REGULATORY REQUIREMENTS

- A. Conform to applicable code for installing work in conformance with ADA.

#### 1.05 COORDINATION

- A. Coordinate the Work with the placement of internal wall reinforcement and reinforcement of toilet partitions to receive anchor attachments.

### PART 2 PRODUCTS

#### 2.01 COMPONENTS

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
  - 1. Grind welded joints smooth.
  - 2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.
- B. Keys: Furnish two keys for each accessory to owner; master key accessories.
- C. Fasteners, Screws, and Bolts: Hot dip galvanized tamper-proof.
- D. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

#### 2.02 ACCESSORIES

- A. Toilet Tissue Dispenser: Bobrick B-27460 or engineer approved equal with cylinder lock.
- B. Grab Bars, 1½" diameter, concealed mounting flange: ASI 3200, Bradley 812, Bobrick B-6806, or Gamco 150C. Assembly shall be able to withstand 300# downward pull.
- C. Sanitary Napkin Disposal Unit: ASI 0473-1A, Bobrick B-254, Bradley 4722-15, or Gamco ND-5.
- D. Soap Dispenser: ASI 0347, Bobrick B-2111, Bradley 6562, or Gamco G-16AP.
- E. Baby Changing Station, surface mounted, horizontal: ASI 9013-9, Bradley 962-11, or Koala KB110-SSWM.
- F. Hand Dryer, High Velocity: Excel Xlerator XL with 1.1 noise reduction nozzle, or engineer approved equal. White finish. Coordinate voltage required with Electrical.



## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that site conditions are ready to receive work and dimensions are as indicated on shop drawings.
- B. Beginning of installation means acceptance of existing substrate.

### 3.02 PREPARATION

- A. Deliver inserts to site at appropriate time for building-in.
- B. Provide templates and rough-in measurements as required.
- C. Verify exact location of accessories for installation.

### 3.03 INSTALLATION

- A. Install fixtures, accessories, and items in accordance to manufacturers' instructions.
- B. Install grab bars so that center of bar is at 34 inches above finished floor.
- C. Install other accessories so that bottom of item is at 40 inches above finished floor, unless noted otherwise.
- D. All accessories shall be mounted so that all operable parts are no more than 48 inches above finished floor.
- E. All accessories shall be mounted so as to comply with ADA and ANSI requirements.
- F. Install plumb and level, securely and rigidly anchored to substrate.

END OF SECTION

## DIVISION 12 - FURNISHINGS

### SECTION 12410

#### NAUTICAL ACCESSORIES

##### PART 1 GENERAL

###### 1.01 SECTION INCLUDES

- A. Wooden Ship Wheel.
- B. Nautical Rope.

###### 1.02 SUBMITTALS

- A. Shop Drawings: Indicate listing sign styles, lettering font, and colors, and overall dimensions of each sign and letter.
- B. Product Data: Submit data on accessories describing size, finish, and attachment methods.

###### 1.03 DELIVERY, STORAGE, AND HANDLING

- A. Store in protected area.

##### PART 2 PRODUCTS

###### 2.01 WOODEN SHIP WHEEL

- A. Material:
  - 1. Wheel: Hardwood.
  - 2. Center hub (nave): Brass.
- B. Size: 36 inch outside diameter.
- C. Finish: Architect to select from manufacturer's standard.
- D. Suppliers:
  - 1. The All Nautical Shoppe, 1004 Quiet Bay Circle, Cicero, IN 46034; (317) 984-9505; [www.allnauticalshoppe.com](http://www.allnauticalshoppe.com).
  - 2. Nautical Seasons, 4519 SE 16<sup>th</sup> Place, Suite 102, Cape Coral, FL 33904; (866) 888-2628; [www.nauticalseasons.com](http://www.nauticalseasons.com).
  - 3. Everything Nautical, Inc., 2609 S. Quebec St #5, Denver, CO 80231; (888) 211-4490; [www.everythingnautical.com](http://www.everythingnautical.com).

## 2.02 NAUTICAL ROPE/CORDAGE

- A. Material: 3-strand twisted nylon.
- B. Size: 1-1/4 inch diameter.
- C. Resistant to rot and mildew. Marine grade.
- D. Color: White.
- E. Suppliers:
  - 1. Barry Cordage Ltd., 6110, Blvd Des Grandes Prairies, Montreal (Quebec), Canada H1P 1A2; (514) 328-1363; [www.barry.ca](http://www.barry.ca).
  - 2. Brace Twine, 1627 College Ave. S.E., Grand Rapids, MI 49507; (800) 835-7673; [www.bracetwine.com](http://www.bracetwine.com).
  - 3. Crystal Coast Cordage, 1103 Evans Street, Morehead City, NC; (252) 726-8452; [www.crystalcoastcordage.com](http://www.crystalcoastcordage.com).
  - 4. Hamilton Marine, Searsport and Portland ME; (800) 639-2715; [www.hamiltonmarine.com](http://www.hamiltonmarine.com).
  - 5. Rope Inc., 262 SW 33<sup>rd</sup> Street, Fort Lauderdale, FL 33315; (888) 596-6575; [www.ropeinc.com](http://www.ropeinc.com).
  - 6. Yale Cordage, 77 Industrial Park, Saco, ME 04072; (207) 282-3396; [www.yalecordage.com](http://www.yalecordage.com).

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Verify that surfaces are ready to receive work.
- B. Beginning of installation means acceptance of substrate.

### 3.02 INSTALLATION

- A. Install in accordance to drawings and manufacturer's instructions.
- B. Install signs after substrate is finished, in locations indicated.

### 3.03 CLEANING

- A. Clean signs per manufacturer's instructions.

END OF SECTION

## **22. Restroom Facility Plumbing, Item SPV.0105.02.**

### **A Description**

This item consists of the plumbing work for the new restroom building. Under this item extent water and sewer piping to the mains in the streets and gas piping to (and including) pressure regulator on outside of the building. The work shall be in accordance to the applicable plans and the following specifications.

### **B Materials**

See specification below.

### **C Construction**

See specification below.

### **D Measurement**

The department will measure Restroom Facility Plumbing as a single lump sum unit of work, acceptably completed.

### **E Payment**

The department will pay for measured quantities at the contract price under the following item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.02	Restroom Facility Plumbing	LS

Payment is full compensation for furnishing all materials and equipment, and for supplying all labor, tools, equipment, and incidentals necessary to complete the work.

## **INDEX OF PLUMBING SPECIFICATIONS**

### **DIVISION 15A – PLUMBING**

#### **15400 - Plumbing**

## DIVISION 15A - PLUMBING

### SECTION 15400

#### PLUMBING

#### PART 1 GENERAL

##### 1.01 WORK INCLUDED

- A. 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 systems and water service.
  - 2. Waste and vent systems and waste service.
  - 3. Plumbing fixtures and trim as shown on the Drawings.
  - 4. Water heating system.
  - 5. Piping, piping specialties, drainage specialties, and plumbing supply specialties.
  - 6. Mechanical Identification.
  - 7. Gas piping and service.
- B. Coordinate services, with required meters, with local utilities. Verify water and gas service pressure at connection.

##### 1.02 WORK FURNISHED BUT INSTALLED UNDER OTHER SECTIONS

- A. Section 04300 – Unit Masonry System: Access panels to be mounted in masonry walls.

##### 1.03. RELATED SECTIONS

- A. 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.
- B. Section 07900 - Joint Sealers: Requirements for sealing of exterior and interior floor, wall, ceiling, and roof penetrations and fixture perimeters concealed after finished installation.
- C. Division 16 - Electrical: Execution requirements for electric connections specified by this section.

##### 1.03 WORK OF OTHER SECTIONS

- A. Openings for work in walls, floor, roof, ceiling, etc., required by this section shall be provided under other sections. Location and size of these openings shall be the responsibility of the contractor.
- B. Division 3 - Concrete

- C. Division 4 – Masonry.
- D. Division 6 - Woods and Plastics.
- E. Division 7 - Thermal and Moisture Protection.
- F. Section 07900 - Joint Sealers: Sealing of exterior and interior floor, wall, ceiling, and roof penetrations and fixture perimeters exposed after finished installation.
- G. Division 9 – Finishes.
- H. Section 09900 – Painting: Painting of piping, insulation, etc.
- I. Section 15600 - Heating, Ventilating, and Air Conditioning: Fuel-fired heating equipment.
- J. Division 16 - Electrical: Electrical line voltage wiring (100 volts and greater) connections.

#### 1.04 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 the 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 the contractor from furnishing such detail in full and proper manner.
- B. The plans show various details indicating the general arrangement of the plumbing work, sizes and locations of piping, equipment, 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 plumbing plans, see General Plans of the building, all plumbing work appearing on the latter plans will be part of this contract unless especially specified to be done by other contractors, as well as, said work detailed on the plumbing plans.

#### 1.05 QUALITY ASSURANCE

- A. Section 01400 - Quality Requirements: Quality provisions.
- B. Perform work in accordance to State of Wisconsin and industry standards.

- C. Qualification of Installer:
1. Company specializing in performing the work of this section with minimum 3 years' documented experience.
  2. In acceptance or rejection of installed work, the architect or engineer shall make no allowances for lack of skill on part of the installers.
  3. Use adequate numbers of skilled workers 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.
  4. All work shall be installed in a first class manner by State of Wisconsin licensed plumbers.
- D. Qualification of Manufacturer:
1. Company specializing in manufacturing products specified in this section with a minimum of 10 years' experience. Manufacturer shall conform to the ratings and certifications indicated.
- E. Codes and regulations:
1. All plumbing installation shall meet the requirements of the State of Wisconsin Board of Health.
  2. In addition to complying with the specified requirements, comply with pertinent regulations of governmental agencies having jurisdiction.
  3. 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.
- F. The following standards, referred hereafter by basic designation only, are imposed, as applicable to work in each instance, and form a part of this specification to the extent indicated by the reference thereto:
- |      |   |
|------|---|
| ANSI | American National Standards Institute   |
| ASME | American Society of Mechanical Engineers  |
| ASTM | American Society for Testing and Materials  |
| AWWA | American Water Works Association  |
| COMM | Department of Commerce, Wisconsin Administrative Code: Plumbing, current edition.                             |
| IEC  | International Energy Code, 2009 edition, and all referenced standards with 2011 State of Wisconsin amendments |

#### 1.06 PERMITS

- A. The contractor shall obtain and pay for all permits required for Work of this section.
- B. One copy of all permits shall be provided to owner.
- C. One copy of all permits shall be maintained on site.

## 1.07 COORDINATION

- A. Section 01300 - Administrative Requirements: Coordination provisions.
- B. Cooperate and coordinate with other trades to assure that all systems in the plumbing 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.
- C. Arrange work in neat, well organized manner with piping and similar services running parallel with primary lines of building construction and with minimum 7 foot overhead clearance. Provide maximum clearances wherever possible.
- D. Locate equipment properly to provide easy access, and arrange entire plumbing work with adequate access for operation and maintenance.
- E. Give right-of-way to piping which must slope for drainage.

## 1.08 SUBMITTALS

- A. The contractor shall be responsible for correction of work deemed necessary by the engineer due to proceeding with the work without shop drawings that have the engineers final approval.
- B. 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.
- C. Shop drawings: include data on physical dimensions, gauges, materials of construction, and capacities.
  - 1. Mechanical Insulation: Product description, list of materials, and thickness for each service or equipment scheduled and locations.
  - 2. Plumbing Fixtures and Equipment: Manufacturer's literature, include capacities, equipment performance, and electrical characteristics.
  - 3. Identification: Submit schedule of labels.
- D. Product Data:
  - 1. Plumbing Drainage Specialties: Submit manufacturers catalog information with sizes, capacities, rough-in requirements, service sizes, and finishes.
  - 2. Plumbing Supply Specialties: Submit manufacturers catalog information with sizes, capacities, rough-in requirements, service sizes, and finishes.
  - 3. Identification: Submit description, dimensions, and materials.

## 1.09 DELIVERY, STORAGE, AND HANDLING

- A. Accept equipment on site in factory packaging. Inspect for damage.



## 1.10 ENVIRONMENTAL REQUIREMENTS

- A. Do not install insulation and related products when ambient temperatures and conditions do not meet manufacturer's requirements.
- B. Maintain temperature before, during, and after installation for minimum period of 24 hours.

## 1.11 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data and Instructions:
  - 1. Submit manufacturer's descriptive literature, operating instructions, service instructions, installation instructions, maintenance and repair data, parts listing, warranties, and wiring diagrams.
  - 2. Assemble two complete sets. Prepare in bound copies complete with index tabs.
  - 3. Submit bound copies to engineer for disbursement.

## PART 2 PRODUCTS

### 2.01 PIPES AND TUBES

- A. Sanitary Sewer Piping and Vent Piping:
  - 1. Buried below the building and outside within 5 feet of the building:
    - a. Polyvinyl Chloride (PVC) Pipe: ASTM D2665 or ASTM D3034 with PVC fittings. Flexible elastomeric gaskets shall conform to ASTM F477.
    - b. Polyvinyl Chloride (PVC) Pipe: ASTM D1785 or ASTM D2665 with solvent cemented joints conforming to ASTM D2466 or ASTM D2467 or ASTM F1866 and ASTM D3311. Primer shall conform to ASTM F656. Solvent shall conform to ASTM D2564.
  - 2. Above ground inside the building:
    - a. Polyvinyl Chloride (PVC) Pipe: ASTM D1785, ASTM D2665, or ASTM F891 with solvent cemented joints conforming to ASTM D2855. Primer shall conform to ASTM F656. Solvent shall conform to ASTM D2564.
    - b. Polyvinyl Chloride (PVC) Pipe: ASTM D1785, ASTM D2665, or ASTM F891 with mechanical push-on joints conforming to ASTM D3212. Flexible elastomeric seals shall conform to ASTM D3139.
- B. Water Piping:
  - 1. General:
    - a. All materials in contact with water shall be suitable for use with potable water.
    - b. All pipes, fittings, and other materials for water supply lines shall be made of a material that contains not contain lead.
    - c. A water supply system shall be resistive to corrosive action and degrading action from the water being conveyed.

- d. Water distribution pipe shall have a minimum working pressure of 100 psig at 180 degrees F, except cold water underground pipe shall have a minimum working pressure at 100 degrees F.
    - e. Joints between different materials shall be made with mechanical compression joints.
  - 2. Buried below the building and outside within 5 feet of the building:
    - a. Copper Tubing: ASTM B42, annealed without fittings. Type K.
  - 3. Above ground inside the building:
    - a. Copper Tubing: ASTM B88, Type L, hard drawn, with cast brass or wrought copper fittings and Grade 95TA soldered joints. Joint surfaces shall be made in accordance to ASTM B828. Solder shall conform to ASTM B32. Flux shall be approved by NSF. ProPress fittings are acceptable.
- C. Natural Gas Piping:
  - 1. Piping and tubing shall have a minimum working pressure of 150 psig.
  - 2. Above ground inside the building:
    - a. Steel Pipe: ASTM A53, Schedule 40 black, with malleable iron or forged steel fittings, screwed or welded. Threaded joints shall comply with ASME B1.20.1.
    - b. Equipment Connections:
      - 1) Steel tubing: ASTM A254 or ASTM A539.
      - 2) Corrugated stainless steel tubing: Tested and listed in compliance with the construction, installation, and performance requirements of ANSI/AGA LC 1.
      - 3) Copper tubing: ASTM B88 or ASTM B280, Type "K" or "L". Shall not be used if gas contains more than an average of 0.3 grains of hydrogen sulfide per 100 standard cubic feet of gas.
      - 4) Tubing joints: Shall be made with approved gas tubing fittings or brazed with a material having a melting point in excess of 1,000° F. Brazing alloys shall not contain more than 0.05% phosphorus.
- D. Equipment Drains and Overflows:
  - 1. Steel Pipe: ASTM A53, Schedule 40 black steel, malleable iron or forged steel fittings, threaded or welded joints.
  - 2. Copper Tubing: ASTM B88 (ASTM B88M), Type L, hard drawn, cast brass, wrought copper or mechanically extracted fittings, lead free solder joints.
  - 3. PVC Pipe: ASTM D1785, Schedule 40, or ASTM D2241, SDR 21 or 26, PVC fittings, solvent weld joints.

## 2.02 VALVES

- A. Valves must be trademarked on body with manufacturer=s name or trademark and pressure rating.

- B. Minimum design pressure of 200 psig and certified for water-oil-gas (WOG) operation.
- C. Gas shut-off valves:
  - 1. Ball valve: bronze body, threaded ends, stainless steel ball, full or conventional port, Teflon seat, blow-proof stem, two-piece construction.
  - 2. UL listed for use as a gas shut-off.
- D. Gas Cocks:
  - 1. Sizes 1/2 inch to 4 inches: DeZurik Fig. 425 gas valve, cast iron body, screwed or flanged ends, bronze bearings, bronze plug and resilient seal ring for bubble-tight shut-off to 175 psig working pressure.
  - 2. UL approved for natural gas.
  - 3. Acceptable manufacturers: Crane, DeZurik, Jenkins, Milwaukee, Nibco, and Walworth.
- E. Gas Regulators:
  - 1. Sizes 3/4 inch to 2 inch: Fisher S100 Series, self-operated regulation with cast iron body, relief, spring steel case, and Nitrile diaphragm.
  - 2. Regulators shall reduce gas supply line (PSIG) pressure to equipment operating pressure (W.C.). Verify supply line pressure with Gas Utility. Verify equipment operating pressure with manufacturer
  - 3. Acceptable manufacturers: Fisher, Leslie, and Spence.
- F. Globe Valves:
  - 1. Up to 2 Inches: Bronze body, bronze trim, rising stem and hand wheel, inside screw, renewable composition disc, solder or threaded ends, with back seating capacity.
  - 2. Over 2 inches: Iron body, bronze trim, rising stem, hand wheel, OS&Y, plug type disc, flanged ends, renewable seat and disc.
- G. Ball Valves:
  - 1. Up to 2 inches: Bronze or stainless steel one piece body, chrome plated brass ball, Teflon seats and stuffing box ring, lever handle, solder or threaded ends.
  - 2. Over 2 inches: Cast steel flanged body, chrome plated steel ball, Teflon seat and stuffing box seals and lever handle.
- H. Relief Valves:
  - 1. Bronze body, Teflon seat, stainless steel stem and springs, automatic, direct pressure actuated capacities ASME certified and labeled.
  - 2. Gas service: stainless steel seat and disc.
  - 3. Acceptable manufacturers: B& G, Crane, Kunkel, or approved equal.

## 2.03 PIPING SPECIALTIES

- A. Flanges, Unions, and Couplings:
  - 1. Pipe Size 2 inches and Under: Malleable iron unions for threaded ferrous piping; bronze unions for copper pipe, soldered joints.
  - 2. Pipe Size Over 2 inches: Forged steel flanges for ferrous piping; bronze flanges for copper piping; preformed neoprene gaskets.
  - 3. Grooved and Shouldered Pipe End Couplings: Malleable iron housing, C-shape elastomer composition sealing gasket, steel bolts, nuts, and washers.
  - 4. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.
- B. Flexible Connectors:
  - 1. Corrugated stainless steel hose with single layer of stainless steel exterior braiding, minimum 9 inches long with copper tube ends; for maximum working pressure 300 psig.
- C. Pressure Gages:
  - 1. Gas Pressure Gauge
    - a. Terice No. 660 with 4-1/2 inch face, bronze bushing movement.
  - 2. Acceptable manufacturers: Kunkle, Taylor, Terice, or approved equal.

## 2.04 PLUMBING DRAINAGE SPECIALTIES

- A. Floor Drains:
  - 1. See Plumbing Fixture and Equipment Schedule on Drawings.
  - 2. Floor Drain:
    - a. General service floor drain for use in areas where foot traffic is expected.
    - b. Cast iron body with flashing collar and adjustable strainer head.
    - c. Nickel bronze round strainer with vandal proof screws.
    - d. Smith 2005 or 2010.
  - 3. Floor Drain, Storage Room:
    - a. Heavy-duty floor drain with sediment bucket for use in traffic areas where wastewater contains sand, sediment, or other debris.
    - b. Cast iron body and flashing collar with cast iron tractor grate and solid freestanding sediment bucket.
    - c. Smith 2142 or 2147.
  - 4. Acceptable Manufacturers: Josam, Smith, Zurn, or approved equal.
- B. Cleanouts:
  - 1. Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.
  - 2. Exterior, in concrete areas: Smith 4250 or 4261 series with cast iron top.

3. Floors:
    - a. Mechanical Room: Smith No. 4020 series with round nickel-bronze top.
    - b. Unfinished room floors: Smith No. 4100 series, heavy-duty with round cast iron top.
  4. Pipes: Provide cleanout tee or plug.
  5. Cleanout plugs shall be bronze, brass, or plastic. Provide bronze plugs for all utility type areas.
    - a. Brass cleanout plugs shall be used with metallic piping only and shall conform to the requirements of ASTM A74.
    - b. Plastic cleanout plugs shall conform to the requirements of ASTM D2464 or ASTM D2466 or ASTM D2467 or ASTM D3311 or ASTM F409 for PVC material.
  6. Cleanouts shall be of the same nominal size as the pipes they serve; except where cleanouts are required in pipes 4 inches and larger, provide 4 inch cleanouts.
  7. Acceptable Manufacturers: Josam, Smith, Zurn, or approved equal.
- C. Traps: For all lavatories and sinks, except service sinks, provide Los Angeles pattern cast brass traps with brass nuts.

## 2.05 PLUMBING SUPPLY SPECIALTIES

- A. Water Hammer Arrestors:
1. Stainless steel construction bellows type or copper construction, piston type To PDI WH 201, pre-charged suitable for operation in temperature range - 100 to 300 degrees F and maximum 250 psi working pressure, permanently sealed.
  2. Water hammer arrestors shall be tested and certified in accordance to the Plumbing Drainage Institute "Standard P.D.I. WH-201."
  3. Acceptable manufacturers: Smith No. 5000 series Hydrotrol, Watts series 15, or equal by Josam.
- B. Hose Bibbs/Hydrants:
1. Interior Hose Bibs: Bronze or brass, replaceable hexagonal disc, hose thread spout, chrome plated with vacuum breaker.
- C. Diaphragm-type Compression Tanks:
1. Construction: Welded steel, ASME tested and stamped; rated for working pressure of 125 psig, with flexible diaphragm sealed into tank.
  2. Accessories: Pressure gage and air-charging fitting and drain.

## 2.06 PIPE INSULATION

- A. Man Made Mineral Fiber (Fiberglass): ASTM C547; rigid molded, noncombustible. Corrosion, moisture, and vermin resistant. CFC and HCFC free.
1. k (ksi) factor: 0.24 at 75 degrees F.

2. Maximum service temperature: 850 degrees F.
  3. Installation Locations: Indoor.
  4. Vapor Retarder Jacket: White Kraft paper with glass fiber yarn and bonded to aluminized film, secured with self-sealing longitudinal laps and butt strips or with outward clinch expanding staples and vapor retarder mastic.
- B. Cellular Foam: ASTM C534; flexible, cellular elastomeric, molded or sheet.
1. Phenolic:
    - a. Chemical resistant and will not sustain vermin or mold.
    - b. Installation Locations: Mild steel, stainless steel, copper, and PVC pipe.
    - c. Vapor Retarder Jacket: Factory applied reinforced aluminum foil.
  2. Urethane:
    - a. Rigid. Fungus and mold resistant and will not sustain vermin.
    - b. k (ksi) Value: 0.27 at 75 degrees F.
    - c. Maximum Service Temperature: 220 degrees F.
    - d. Surface Burning Characteristics: Flame spread - 25 or less, smoke development - 50 or less.
    - e. Closed Cell Content: 90%.
    - f. Connection: Waterproof vapor retarder adhesive.
- C. Jackets:
1. Canvas Jacket: UL listed fabric, 6 oz per sq yd, plain weave cotton treated with dilute fire retardant lagging adhesive.
- D. Composite piping insulation (insulation, jackets, coverings, sealers, mastics, and adhesives) shall have ratings not exceeding flame spread of 25 and a smoke developed rating of 150 (test method ASTM E-84).
- E. Comply with all codes regarding the use of foam insulation.
- F. Acceptable Manufacturers: Armstrong, Johns Manville, Knauf, Owens Corning, Pittsburgh Corning Corp., or equal.
- G. Schedule:
1. Installer's option where more than one type is indicated.
  2. Domestic Hot and Cold Water:
    - a. Glass Fiber Insulation.
      - 1) Jacket: Canvas
      - 2) Schedule
        - a) Hot Water
- | <u>Pipe Size Range</u> | <u>Thickness</u> |
|------------------------|------------------|
| 1/2 inch to 2 inches   | 1 inch           |
| 2 1/2 inches and over  | 1 1/2 inches     |

- |  |    |                        |                  |
|--|----|------------------------|------------------|
|  | b) | Cold Water             |                  |
|  |    | <u>Pipe Size Range</u> | <u>Thickness</u> |
|  |    | 1/2 inch to 1 inch     | 1/2 inch         |
|  |    | 1 1/4 inch to 2 inches | 3/4 inch         |
|  |    | 2 1/2 inches and over  | 1 inch           |
- b. Cellular Foam (molded):
- 1) Insulation shall only be used where piping is installed within walls.
  - 2) Same as Glass Fiber Insulation.
3. Plumbing Vents, within 10 feet of building exterior:
- a. Glass Fiber Insulation.
    - 1) Thickness: 1/2 inch.

## 2.07 SPECIALTY INSULATION

- A. Manville "Aerotube" insulation, with paint coating, assemblies as manufactured by Truebro, or an approved equivalent.

## 2.08 SLEEVES

- A. Sleeves for pipes through non-fire rated floors: 18 gage thick galvanized steel.
- B. Sleeves for pipes through non-fire rated beams, walls, footings, and potentially wet floors: Steel pipe or 18 gage thick galvanized steel.
- C. Sleeves shall be of sufficient length to pass through entire floor or wall construction, including plaster, finished floor, etc., as applicable. Sleeves through floors shall extend 1 inch above finished floor level.
- D. All sleeves shall be of sufficient diameter such that the bare or insulated pipe, as applicable, with unbroken pipe covering or wrapping, where specified, can pass through and allow for expansion and contraction in all directions.
  1. Uninsulated: Sleeve shall be two pipe sizes larger than the pipe passing through; or provide a minimum of 1/2 inch clearance between inside of sleeve and outside of the pipe.
  2. Insulated: Sleeve shall be of adequate size to accommodate the full thickness of pipe covering, with clearance for packing and caulking.
- E. Mechanical sleeve seals: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

## 2.09 ESCUTCHEONS

- A. 1 inch wide or of sufficient size to cover the sleeved opening and an inside diameter to fit snugly around pipe.
- B. Finish shall be chrome-plated steel.

## 2.10 PIPE HANGERS AND SUPPORTS

- A. Plumbing Piping - Drain, waste, vent, and domestic water:
  - 1. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Malleable iron or carbon steel, adjustable swivel, split ring.
  - 2. Hangers for Pipe Sizes 2 inches and Over: Carbon steel, adjustable, clevis.
  - 3. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
  - 4. Wall Support for Pipe Sizes to 3 inches: Cast iron hook.
  - 5. Vertical Support: Steel riser clamp.
  - 6. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
  - 7. Copper Pipe Support: Copper-plated, carbon-steel adjustable, ring.
- B. With supporting stands, struts, rods, plates, brackets, and attachments as necessary.
- C. Standard or heavy-duty grade.
- D. Acceptable manufacturers: B-Line, Fee and Mason, or equal.
- E. Pipe Hanger Spacing:

<u>Pipe size:</u>	<u>max. hanger spacing</u>	<u>hanger rod diameter</u>
1/2 to 1-1/4	6'	3/8"
1-1/2 to 2	10'	3/8"
2-1/2 to 3	10'	1/2"
4 to 6	10'	5/8"
PVC (All Sizes)	6'	3/8"

## 2.11 FIXTURES AND EQUIPMENT

- A. See Plumbing Fixture and Equipment Schedule on Drawings.
- B. Water Closets, stainless steel:
  - 1. Fixture:
    - a. Floor mounted blowout jet fixture with elongated bowl, integral toilet seat, 1-1/2 inch back inlet connection; trap shall have minimum 3-1/2 inch seal and shall pass 2-1/8-inch diameter ball and be fully enclosed.



- b. All cabinet materials and interior piping shall be Type 304 stainless steel. Fixture shall be made from heavy gauge stainless steel with seamless welded surfaces.
  - c. All accessible seams and voids shall be eliminated. Fixture shall withstand 5,000 pound load on front area of toilet (certified test results shall be submitted) without permanent deflection and damage.
  - d. Consumption: 3.4 gallons per flush.
  - e. Finish: All exposed surfaces shall have #4 satin polished finish with integral contoured seat polished to #7 sanitary finish.
  - f. Wall Anchoring: No exposed mounting fasteners in toilet room.
2. Flush Valve:
- a. Concealed, water closet flushometer for stainless steel back inlet bowls.
  - b. Quiet, concealed, hydraulically activated, diaphragm type, rough brass closet flushometer, ADA compliant non-hold-open metal push button actuator, high pressure back pressure vacuum breaker, fixed metering bypass and no external volume adjustment. Valve body, cover, tailpiece, and control stop shall be in conformance with ASTM Alloy Classification for Semi-Red Brass. Valve shall be in compliance to the applicable sections of ASSE 1037.
  - c. Acceptable Products: Sloan Royal 9611, Zurn ZH611AV-MBP, or approved equal.

C. Urinals, Stainless Steel:

1. Fixture:
- a. Wall hung (chase mounted) washout fixture with continuous flushing rim which washed all four walls, 2-inch diameter trap shall have 4-inch seal and pass a 1.9-inch ball, 3/4-inch rear inlet, with bottom sloped to integrally welded high-capacity stainless steel beehive dome strainer.
  - b. All cabinet materials and interior piping shall be Type 304 stainless steel. Fixture shall be made from heavy gauge stainless steel with seamless welded surfaces. P-trap shall be stainless steel.
  - c. All accessible seams and voids shall be eliminated. P-trap shall be fully enclosed and there shall be no accessible seams, voids or crevices.
  - d. Consumption: 1.5 to 1.6 gallons per flush.
  - e. Finish: All exposed surfaces shall have #4 satin polished finish.
  - f. Wall Anchoring: No exposed mounting fasteners in toilet room.
  - g. Acceptable Products: Bradley URI8100, Acorn Penal-Ware 1702-CFR, 7120 Metcraft, or approved equal.
2. Flush Valve:
- a. Concealed flushometer for stainless steel back spud urinals.
  - b. Quiet, concealed, hydraulically operated, diaphragm type, rough brass urinal flushometer, ADA compliant non-hold-open metal push button actuator, vacuum breaker, and dual filtered bypass. Valve

body, cover, tailpiece, and control stop shall be in conformance with ASTM Alloy Classification for Semi-Red Brass. Valve shall be in compliance to the applicable sections of ASSE 1037, ANSI/ASTM 112.19.6 and Military Specification V-29193.

- c. Acceptable Products: Sloan Royal 995, Zurn ZH6195AV-11, or approved equal.

D. Lavatories, Stainless Steel:

1. Fixture:

- a. Wall hung (chase mounted) barrier-free rectangular stainless steel, approximately 18-inches deep by 18-inches wide by 5-inches high lavatory with integral 3-inch high backsplash; bowl shall be approximately 14-1/2-inches by 9-1/2-inches by 5-inches; cabinet shall have fully enclosed bottom.
- b. All cabinet materials and interior piping shall be Type 304 stainless steel. Fixture shall be made from heavy gauge stainless steel with seamless welded surfaces.
- c. All accessible seams and voids shall be eliminated. P-trap shall be fully enclosed and there shall be no accessible seams, voids or crevices.
- d. Finish: All exposed surfaces shall have #4 satin polished finish.
- e. Wall Anchoring: No exposed mounting fasteners in toilet room.
- f. Acceptable Products: Bradley LAV6101, Acorn Penal-Ware 1652LRB, HS-1014-96-HC Willoughby Industries, or approved equal.

2. Faucet:

- a. Deck mounted, electronic lavatory faucet with dual beam infrared sensor.
- b. Polished chrome plated metal construction, 6 volt lithium CR-P2 battery, low battery indicator, metal spout with 0.5 gallons per minute vandal resistant spray outlet, multiple field adjustable modes and ranges, above deck hermetically sealed electronics module and solenoid with filter screen, 1/2-inch NPSM brass shank with filter screen, mounting hardware, ADA compliant with open grid strainer.
- c. Product shall meet ASME A112.18.1M, CSA B125.1, certified to NSF/ANSI 61, Section 9 by CSA.
- d. Acceptable Products: 116.606.21.1 Chicago Faucet or approved equal.

E. Drinking Fountains:

1. Wall Mounted Dual Drinking Fountain:

- a. Shall meet NSF-61 requirements for lead-free and have UL approved label.
- b. Frame: One-piece welded construction, 304 schedule 10 stainless steel.
- c. Receptor Bowl: 18 gauge polished stainless steel.

- d. Bubbler Head: Heavy-duty, stainless steel anti-squirt head with shield.
  - e. Push Bar: 304 stainless steel with stainless steel housing.
  - f. Control Valve: Non-cartridge stainless steel O-Ring to deliver non-spurt, adjustable steady stream of water. Washerless.
  - g. Water Supply: Maintenance free reinforced nylobraid (not plastic) tubing and 304 stainless steel fittings. Union fittings at every connection.
  - h. Waste: 1½-inch schedule 40 PVC pipe.
  - i. Access: Working parts shall be accessible through bowl for service.
  - j. Acceptable Manufacturers: Most Dependable Fountains or equal.
- F. Service Sinks:
  - 1. Bowl: 24 x 24 x 10 inch high molded stone, floor mounted, with 1 inch wide shoulders, stainless steel strainer.
  - 2. Trim: Exposed wall type supply with indexed lever handles, spout wall brace, vacuum breaker, hose end spout, strainers, eccentric adjustable inlets, and adjustable threaded wall flanges. Five feet of 1/2 inch diameter plain end reinforced rubber hose, and hose clamp.
- G. Utility Sinks:
  - 1. Bowl: 20 x 24 x 13 inch deep molded stone with adjustable legs, floor mounted, with stainless steel strainer.
  - 2. Trim: Chrome plated brass supply with swing spout, water economy aerator with maximum 2.2 gpm flow, indexed lever handles, chrome plated brass P-trap and arm with escutcheon.
- H. Provide all necessary accessories and ancillary devices for a complete and operable system.

## 2.12 EQUIPMENT

- A. Electric Water Heaters:
  - 1. Factory-assembled and wired, electric, vertical storage type:
    - a. Storage: 20 gal capacity.
    - b. Input: 9 kW.
    - c. Minimum recovery rate: 50 gph (first hour) with 100 degrees F temperature rise.
    - d. Maximum working pressure: 150 psi.
  - 2. Welded steel ASME labeled pressure vessel; automatic immersion water thermostat, flanged or screw-in nichrome elements, high temperature limit thermostat, and ASME rated temperature and pressure relief valve.

## 2.13 ACCESS PANELS

- A. Insulated Panels:
  - 1. Door: 14 gauge steel.
  - 2. Frame: 14 gauge steel, prime coated.
  - 3. Finish: Gray baked enamel prime coat, suitable for field painting.
  - 4. Hinge: Continuous type.
  - 5. Latch: Key lock latch mechanism.
  - 6. Insulation: 2 inches.
  - 7. Model: HGFD by J.L. Industries.
- B. Acceptable manufacturers: Bilco, J.L. Industries, Larsen's, Milcor, Nystrom.

## 2.14 FLASHING

- A. One-piece:
  - 1. One-piece galvanized sheet base with flexible collar for leak proof installation.
  - 2. Acceptable manufacturers: Oatey or equal.

## 2.15 IDENTIFICATION

- A. Mechanical identification
  - 1. Plastic Nameplates: Laminated three-layer plastic with engraved black letters on light background color.
  - 2. Plastic Tags: Laminated three-layer plastic with engraved black letters on light background color. Lettering shall be minimum of 1/2 inch in height
    - a. Gas Service: Circle, minimum 1 1/2 inch diameter.
    - b. Water Service: Circle shape, 3 inch diameter, and bearing the legend "safe water".
  - 3. Brass Tags: minimum 1 1/2 inches diameter.
  - 4. Plastic Pipe Markers: Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering. Larger sizes may have a minimum sheet size with stainless steel spring fastener. Minimum width of 3 inches, to comply with State of Wisconsin Plumbing Code. Color and Lettering: Conform to ASME A13.1 and State of Wisconsin Plumbing Code.
  - 5. Plastic Tape Pipe Markers: Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings. Minimum width of 3 inches, to comply with State of Wisconsin Plumbing Code. Color and Lettering: Comply with ASME A13.1 and State of Wisconsin Plumbing Code.
  - 6. Plastic Underground Pipe Markers: Bright colored continuously printed plastic ribbon tape, minimum 6 inches wide by 4 mil thick, manufactured for direct burial service.

7. Metal Tags: Non-corrosive metal with raised or engraved letters. Lettering shall be a minimum of 1/2 inch in height.
  - a. Gas Service: Circle, minimum 1 1/2 inch diameter.
  - b. Water Service: Circle shape, 3 inch diameter, and bearing the legend "safe water".

B. Framed, typewritten valve directory under glass.

## 2.16 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 engineer.
- B. Formed steel channels: Galvanized 12 gage thick steel with holes 1 1/2 inches on center.

## PART 3 EXECUTION

### 3.01 JOB CONDITIONS

- A. Surface Conditions: Examine the areas and conditions under which work will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- B. Cooperate as necessary with other trades in order that all work be installed in the best arrangement. Coordinate as required with all other trades to share space in common areas and to provide the maximum access to each system. Coordinate openings and placement of sleeves and inserts in building construction.
- C. Measurements:
  1. Field measuring existing conditions.
  2. Lay out work, properly locate all apparatus, pipe, fittings, fixtures, sleeves, etc. Adjust work, as necessary, to ensure that work shall fit into the spaces that have been allotted for such work. Due regard shall be taken for the work of other trades.
- D. Proceed as rapidly as the building construction will permit.

### 3.02 ELECTRICAL PROVISIONS

- A. Contractor shall furnish complete list and location of equipment requiring electrical connections and necessary wiring diagrams to Division 16.
- B. Division 16: All line voltage electrical wiring connections.

### 3.03 INSTALLATION- GENERAL

- A. Locations: Install all fixtures and equipment in the locations shown on the drawings, except where specifically otherwise approved on the job by the owner.
- B. All fixtures and equipment, as called for on the drawings and herein specified, shall be installed in strict accordance with manufacturer's recommendations.
- C. Interferences: Avoid interference with structure, and with work of other trades, preserving adequate headroom and clearing all doors and passageways.
- D. Inspection: Check each fixture and 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
- E. Section 07900: Caulk around the exterior perimeter of fixtures and where called for on the drawings in areas visible after finished construction
- F. General: All valves, fixtures, equipment, and accessories shall be installed to permit access to equipment for maintenance, servicing, or repairs. Relocation of piping or equipment to accomplish equipment access shall be completed by the contractor, at no additional cost to the owner.
- G. Provide access doors where valves or equipment are located in chases or inaccessible locations. Access panels shall be furnished by the contractor and installed by the specific trade responsible for the material in which the access panels are installed.

### 3.04 PLUMBING SYSTEM LAYOUT

- A. Lay out the plumbing system in careful coordination with the Drawings, determine 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 than as shown on the Drawings, unless noted otherwise on drawings.
- D. Schematics are shown for size requirements and arranged only. Field conditions shall determine actual routes.

### 3.05 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, do not over-excavate. Make trenches 12 inches 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 inch bed of damp sand. Backfill to bottom of slab with damp sand.
  - 3. Outside the building, install underground piping on a 6 inch bed of damp sand. Backfill to within 12 inches of finish grade with damp sand. Backfill remainder with native soil.
  - 4. Do not backfill until installation has been approved and until Project Record Documents have been properly annotated.

### 3.06 FLOOR, WALL, ROOF, AND CEILING OPENINGS

- A. All openings for work of this section shall be provided under other sections. Openings shall be made as necessary in ceiling, floors, walls, roof, etc., as required to permit the installation of Work specified or shown on the Drawings. Openings shall be made with care to avoid damage that cannot be concealed when work is completed.
- B. Provisions for openings and holes and clearances through walls, floors, and ceilings to be made in advance of construction of such parts of the building. The contractor is responsible for the correct size and location of these openings.

### 3.07 SERVICE CONNECTIONS

- A. Install sanitary sewer services. Before commencing work check invert elevations required for sewer connections, confirm inverts and verify proper slope for drainage and proper cover to avoid freezing.
- B. Install new water service complete with water meter with by-pass valves. Floor-Install sleeve around service main to 6 inch above floor and 6 feet minimum below grade. Before commencing work check invert elevations required for water service connections and verify proper cover to avoid freezing. Verify water pressure at connection.
- C. Install new gas service complete with gas meter and regulators. Verify gas utility pressure at building service connection. Install regulators on each line serving gravity type appliances, sized in accordance to equipment. For pressures above 7 inch wg, use pressure regulators at system service entrance or at each piece of

equipment. All regulator vents shall be piped to a safe location outside the building.

### 3.08 INSTALLATION - SLEEVES

- A. Provide and install sleeves wherever piping passes through floors, walls, partitions, ceilings, etc.
- B. Exterior watertight entries: Seal with mechanical sleeve seals.
- C. Sleeves shall be set and maintained in place during the progress of the work. Set sleeves in position in forms. Set sleeves in place before concrete is placed. Provide reinforcing around sleeves.
- D. Sleeves shall be securely fastened in place.
- E. Extend sleeves through floors 1 inch above finished floor level.
- F. Where piping penetrates floor, ceiling, wall, etc. close off space between pipe and adjacent work with stuffing, for penetrations through non-rated assemblies, and firestopping, for penetrations through rated assemblies, insulation to within ½ inch of wall face.
- G. Caulk the space between the sleeve and pipe or pipe covering for all sleeves and penetrations not visible after finished installation or hidden behind covers.
- H. Section 07900: Caulking of all sleeves and penetrations visible after finished installation.
- I. Provide close fitting metal collar, escutcheon covers, or plates wherever piping or hanger rods are exposed to view and pass through floor, wall, ceiling, partitions, and similar locations. Hold escutcheons in place with set screw.

### 3.09 INSTALLATION - PIPE

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside piping before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

### 3.10 INSTALLATION - PIPING SYSTEMS

- A. Install dielectric connections wherever jointing dissimilar metals.
- B. Install unions downstream of valves and at equipment or apparatus connections.
- C. Route piping parallel to building structure and maintain gradient.



- D. Install piping to maintain headroom. Group piping to conserve space. Group piping whenever practical at common elevations.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- F. Thoroughly clean items before installation.
- G. Bolt all equipment, isolators, hangers, and similar items securely in place.
- H. 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.
- I. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
- J. Sleeve pipe passing through partitions, walls and floors.
- K. Install piping system allowing clearance for installation of insulation and access to valves and fittings.
- L. Install piping, equipment, valves, and other items to permit access for maintenance. Relocate items as necessary to provide such access, and without additional cost to the owner.
- M. Provide access doors where valves, clean outs, and fixtures 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.
- N. Install identification on piping systems including underground piping.
- O. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.
- P. Make changes in directions with fittings; make changes in main sizes with eccentric reducing fittings.
- Q. Provide sufficient swing joint, ball joints, expansion loops, and devices necessary for a flexible piping system, whether or not shown on the Drawings.
- R. Support piping independently at pumps, coils, tanks, and similar locations so that weight of pipe will not be supported by the equipment.

- S. Pipe Joints:
1. Copper Tubing:
    - a. Cut square, remove burrs, and clean inside of female fitting to a bright finish.
      - 1) Apply solder flux with brush to tubing.
      - 2) Remove internal parts of solder-end valves prior to soldering.
    - b. Provide dielectric unions at points of connection of copper tubing to ferrous piping and equipment.
    - c. For joining copper tubing, use the following:
      - 1) Water piping 3 inches and smaller: 95-5 solder;
      - 2) Water piping larger than 3 inches: "Sil-fos" brazing;
      - 3) Underground: "Sil-fos" brazing.
  2. Screwed Piping:
    - a. Deburr cuts.
      - 1) Do not ream exceeding internal diameter of the pipe.
      - 2) Thread to requirements of ANSI B2.1.
    - b. Use Teflon tape on male thread prior to joining other services.
    - c. Use litharge and glycerin on joint prior to cleaning for air and oil piping.
  3. Leaky Joints:
    - a. Remake with new material.
    - b. Remove leaking section and/or fitting as directed.
    - c. Do not use thread cement or sealant to tighten joint.

### 3.11 INSTALLATION - VALVES

- A. Install valves in water system 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.
  6. As specified herein.
- C. Install valves with stems upright or horizontal, not inverted.
- D. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers. For lines 2 inches and smaller, ball valves may be used.
- E. Install globe or ball valves for bypass or manual flow control services.
- F. Install 3/4 inch ball drain valves at main shut-off valves, low points of piping, bases of vertical risers, and at equipment.

### 3.12 INSTALLATION - PLUMBING SUPPLY PIPING

- A. Install water piping in accordance to ASME B31.9.
- B. Establish elevations of buried piping outside the building to obtain not less than four (4) feet of cover.
- C. Provide support for utility meters in accordance to requirements of utility companies.
- D. Slope water piping upwards adequately in direction of flow and arrange to drain at low points, for complete drainage of system.
- E. Install piping with straight side of eccentric fittings at top of pipe, unless noted otherwise.
- F. Install piping from relief valves, back-flow preventers, air vents, and other drains to nearest floor drain, open sight drain, or other acceptable discharge point. Terminate with a plain and unthreaded pipe 6 inches above the drain.
- G. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping to lavatories and sinks.
  - 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 to Plumbing and Drainage Institute Standard "P.D.I. WH-201."
  - 3. Install water hammer arrestors behind access panels where installed within wall construction.
- H. Provide water service complete with water meter with by-pass valves.
- I. Test supply piping in accordance to local code requirements.

### 3.13 INSTALLATION - PLUMBING DRAINAGE PIPING

- A. Install bell and spigot pipe with bell end upstream.
- B. Establish elevations of buried piping outside building to provide not less than 4 feet of cover.
- C. Establish invert elevations, slopes for drainage to 1/8 inch per foot minimum, unless noted otherwise. Maintain gradients.
- D. Floor drains shall be installed prior to placement of concrete slab. Install top of drain at elevation shown on the drawings; if top of drain elevation is not noted on drawings, floor drain shall be installed so that adjacent areas slope toward the drain at a maximum slope of 1 inch in 50 inches; unless noted otherwise.

- E. Floor drains shall be so constructed with an AP@ trap and shall be provided with removable strainers, unless otherwise noted on drawings.
- F. Drain lines shall be so constructed so that they may be cleaned and so that the drain inlet is accessible.
- G. Cleanouts:
  - 1. Secure the Architect=s approval of locations for cleanouts in finished areas prior to installation.
  - 2. Make all cleanouts accessible. Install with clearance at cleanout for rodding of drainage system.
  - 3. Extend cleanouts to finished floor or wall surface.
  - 4. Encase exterior cleanouts in concrete flush with grade.
  - 5. Install floor cleanouts at elevation to accommodate finished floor.
  - 6. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil after pressure tests are made and approved.
- H. All vents must rise. No vent-to-vent connection allowed below floor, except for loop-vent construction.
- I. Pipe the drains from drip pans and other similar locations to nearest floor drain, open sight drain, or other acceptable discharge point. Terminate with a plain and unthreaded pipe 6 inches above the drain.
- J. Install piping penetrating roofed areas to maintain integrity of roof assembly.
- K. Vents shall extend not less than 8 inches nor more than 12 inches above finished roof level.
- L. All pipes passing through the roof shall be flashed. Flashing shall be by Division 7.
- M. Test drainage piping in accordance to local code requirements.

### 3.14 INSTALLATION - FUEL PIPING

- A. Install natural gas piping in accordance to NFPA 54.
- B. Provide clearance for installation of insulation and access to valves and fittings.
- C. Establish elevations of buried piping outside building to provide not less than one (1) foot of cover.
- D. Provide support for utility meters in accordance to requirements of utility company.
- E. Pipe vents from gas pressure reducing valves, regulators, and relief vents to outdoors and terminate in weatherproof hood with bug screen.
- F. Test natural gas piping in accordance to NFPA 54.

- G. Coated and wrapped gas piping shall be checked with an approved electrical flow detector set to place a minimum of 6,000 volts across the coating film and all defects found shall be repaired.
- H. Underfloor piping shall be installed within Schedule 40 PVC conduit at least two pipe sizes larger than gas piping. Conduit shall extend 1 inch above floor.

### 3.15 INSTALLATION - PIPE HANGERS AND SUPPORTS

- A. Support horizontal piping as scheduled.
- B. Pipe hangers shall be installed according to recommendations of the pipe manufacturer and hanger manufacturer.
- C. Space hangers and supports according to the schedule, unless shorter distances are required by other standards or standard industry practice and to prevent excessive pipe movement during normal operations.
- D. Arrange supports to prevent excessive deflection and to avoid excessive bending stress.
- E. Install hangers with minimum 1/2 inch space between finished covering and adjacent work.
- F. Insulation shall be continuous through hangers. Protect insulation with galvanized steel shields.
- G. Place hangers within 12 inches of each horizontal elbow.
- H. Use hangers with 1-1/2 inch minimum vertical adjustment.
- I. Horizontal cast iron hubless pipe:
  - 1. Support pipe adjacent to each hub, on both sides and within 6 inches of, so that coupling will bear no weight.
  - 2. Do not provide hangers on couplings.
  - 3. 5 feet maximum spacing between hangers.
  - 4. Provide hangers adequate to maintain alignment and to prevent sagging of the pipe.
  - 5. Make adequate provision to prevent shearing and twisting of pipe and joint.
- J. Support vertical piping at floor. Support vertical cast iron pipe at floor at hub. Supports shall be secured to the piping and resting on the building structure.
- K. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.
- L. Support each pipe independently. Do not use wire for hanging or strapping pipes.

- M. Support riser piping independently of connected horizontal piping.
- N. For copper piping, provide copper plated hangers and supports or sheet lead packing between hanger or support and piping.
- O. Design hangers for pipe movement without disengagement of supported pipe.
- P. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
- Q. Provide sway bracing on hangers longer than 18 inches.
- R. Piping can be surface mounted to walls and ceilings, unless noted otherwise.

### 3.16 INSTALLATION - INSULATION

- A. Piping Insulation:
  - 1. Insulate complete system of pipes for the following: hot and cold domestic water piping located in interior space of building, including all piping located inside walls, unless noted otherwise.
  - 2. Continue insulation vapor barrier through penetrations.
  - 3. Locate insulation and cover seams in least visible locations.
  - 4. Neatly finish insulation at supports, protrusions, and interruptions.
  - 5. Install fiberglass insulated pipes conveying fluids below ambient temperature with vapor barrier jackets. Finish with glass cloth and vapor barrier adhesive.
  - 6. For man made mineral fiber insulated pipes conveying fluids above ambient temperature, install standard jackets. Bevel and seal ends of insulation at equipment, flanges, and unions.
  - 7. Install insert between support shield and piping on piping 2 inches diameter or larger. Fabricate of cork or other high density insulating material suitable for temperature, not less than 6 inches long.
  - 8. For pipe exposed finish with canvas jacket sized for finish painting.
- B. Specialty Insulation:
  - 1. At all lavatories and sinks, except service sinks, install insulation to cover hot water supply, cold water supply, tailpiece, and trap.

### 3.17 INSTALLATION - FIXTURES

- A. Show no tool marks or threads on exposed plated, polished, or enameled connections from fixtures. Tape all finished surfaces to prevent damage during construction.
- B. Set fixtures in proper alignment with respect to walls and floors.
- C. Provide supplies in proper alignment with fixtures and with each other.

- D. Grout wall and floor mounted fixtures watertight where the fixtures are in contact with walls and floors.
- E. Install each fixture with chrome plated rigid or flexible supplies with screwdriver stops, reducers, and escutcheons.
- F. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.
- G. Install water heaters in accordance to UL requirements. Coordinate with plumbing piping and related electrical work to achieve operating system.
- H. Install steel pipe support for tanks, independent of building structural framing members.
- I. Clean and flush tanks after installation. Keep openings sealed until pipe connections are made.
- J. On tanks, install drain at water inlet and outlet, thermometer with range of 40 to 200 degrees F, and ASME pressure relief valve suitable for maximum working pressure.
- K. Install sealant required for plumbing installation, which is concealed once fixture is in place.
- L. Section 07900: All caulking exposed after finished installation for deck-mounted trim, self-rimming sinks installed in casework, wall mounted fixtures, etc.

### 3.18 INSTALLATION - MECHANICAL IDENTIFICATION

- A. Install adequate marking of exposed accessible piping, per ANSI A13.1.
- B. Install plastic nameplates with adhesive when mounting to metal equipment cabinets and screws when mounting to building materials.
- C. Install plastic and metal tags with corrosion resistant metal chain.
- D. Valves:
  - 1. Tag all valves, except potable water fixture stop valves, with metal tags.
  - 2. Install valve directory where directed.
- E. Pipes:
  - 1. Install plastic pipe markers or plastic tape pipe markers on all pipes with canvas paintable jacket. Do not install until after pipe has been painted.
  - 2. Install per State of Wisconsin Plumbing Code and as follows: Space no more than 25 feet apart, with a minimum of one marker on each straight section of pipe, and at each side where the piping passes through a wall, floor, or roof.

3. Color of bands shall comply with State of Wisconsin Plumbing Code:  
Potable water - green.

### 3.19 PAINTING

- A. Section 09900: Painting of piping, valves, access panels, and specialties. All exposed piping and equipment, without factory finish or finished cover, shall be painted.
- B. Touch-up all factory finishes damaged during construction.

### 3.20 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Perform disinfection under the engineer's observation. Notify the engineer at least 48 hours prior to start of the disinfection process.
- B. Disinfecting of Domestic Water Systems:
  1. Prior to starting, verify system is complete, flushed and clean.
  2. Verify pH of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
  3. Inject disinfectant, free chlorine in liquid, powder and tablet or gas form, throughout system to obtain residual from 50 to 80 mg/L.
  4. Bleed water from outlets to obtain distribution and test for disinfectant residual at minimum 15 percent of outlets.
  5. Maintain disinfectant in system for 24 hours.
  6. When final disinfectant residual tests less than 25 mg/L, repeat treatment.
  7. Flush disinfectant from system until residual concentration is equal to incoming water or 1.0 mg/L.
  8. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance to AWWA C651.
- C. 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.
- D. When disinfection operation is completed, and after final flushing, secure an analysis by a laboratory approved by the engineer, 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.
- E. If analysis results are not satisfactory, repeat the disinfection procedures and retest until specified standards are achieved.

### 3.21 TESTING AND ADJUSTING

- A. Contractor shall notify any inspectors required to observe test, when test is ready to be performed. Contractor shall advise A/E field representative that notification has been given.



- B. All equipment required for testing, including fittings for additional openings, shall be provided by contractor. Provide all openings inside and outside the building as required. Contractor shall provide all personnel required for testing. Contractor shall pay the cost of all required tests and retests and inspections if required.
- C. Tests shall be witnessed and approved by owner=s representatives and A/E field representative. Contractor shall certify in writing the time, date, name, and title of person approving test. This shall also include the description and what portion of the system has been approved. Person approving test shall sign certification.
- D. A complete record shall be maintained of all testing that has been approved, and shall be made available at the job site to all authorities concerned.
- E. Upon completion of the work, all records and certifications approving testing requirements shall be submitted to the A/E field representative before final payment is made.
- F. Water test entire drainage system (sanitary and vent system) by sections if necessary, with a minimum of 10 foot head for two hours without loss of water. If weather makes water test impractical, use air test with 10 inches of mercury column pressure and no loss of pressure for at least 15 minutes.
- G. Water test entire domestic water systems, by sections if necessary, before connecting fixtures, with hydrostatic pressure of 100 PSI without loss of pressure for at least two hours.
- H. Natural gas piping shall be tested as per domestic water, except with air.
- I. Notify A/E in advance regarding time and date of all tests.
- J. Defective work or material shall be replaced or repaired, as necessary, and the inspection and test repeated. Repairs shall be made with new materials. Caulking of screwed joints or holes will not be acceptable.
- K. Adjust the system to optimum standards of operation.

### 3.22 CLOSEOUT OPERATIONS

- A. Closeout Equipment/System Operations: Sequence operations properly so that work of the project will not be damaged or endangered. Coordinate with seasonal requirements.
  - 1. Adjust and correct operations as required for proper performance.
  - 2. Clean each system: After all equipment and fixtures have been proven operational, carefully clean all accessible parts, thoroughly removing all traces of dirt, oil, grease, and foreign substances.

- B. Instruction: Upon completion of the installation, but before final acceptance of the system, the contractor shall instruct the owner (Owner=s personnel) on the proper operation and maintenance of all parts of the system.
- C. Record Drawings.

END OF SECTION

## **23. Restroom Facility (HVAC) Ventilation, Item SPV.0105.03.**

### **A Description**

This item consists of the heating and ventilating work for the new restroom building. The work shall be in accordance to the applicable plans and the following specifications.

### **B Materials**

See specifications below.

### **C Construction**

See specifications below.

### **D Measurement**

The department will measure Restroom Facility (HVAC) Ventilation as a single lump sum unit of work, acceptably completed.

### **E Payment**

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.03	Restroom Facility (HVAC) Ventilation	LS

Payment is full compensation for furnishing all materials and equipment, and for supplying all labor, tools, equipment, and incidentals necessary to complete the work.

## **INDEX OF HEATING AND VENTILATING SPECIFICATIONS**

### **DIVISION 15B – HEATING AND VENTILATING**

#### **15600 – Heating, Ventilating and Air Conditioning**

DIVISION 15B - HEATING AND VENTILATING  
SECTION 15600

HEATING, VENTILATING AND AIR CONDITIONING

PART 1 GENERAL

1.01 WORK INCLUDED

- A. Provide system where shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:
  - 1. Exhaust fans, motors.
  - 2. Forced air furnace system: furnace, filters, motors.
  - 3. Controls: Low-voltage wiring, conduit, relays, thermostats, dampers, damper operators, etc.
  - 4. Air Distribution: Ductwork, insulation, duct accessories, louvers, grilles, etc.
  - 5. Related accessories.
  - 6. Testing, adjusting, and balancing.

1.02 RELATED SECTIONS

- A. 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.
- B. Division 5 - Metals: Equipment structural supports, anchors, etc.
- C. Section 07900 - Joint Sealers: Requirements for sealing of exterior and interior floor, wall, ceiling, and roof penetrations concealed after finished installation.
- D. Division 16 - Electrical: Execution requirements for electric connections specified by this section.

1.03 WORK OF OTHER SECTIONS

- A. Openings for work in walls, floor, roof, ceiling, etc., required by this section shall be provided under other sections. Location and size of these openings shall be the responsibility of this contractor.
- B. Division 3 - Concrete.
- C. Division 4 - Masonry.
- D. Division 6 - Woods and Plastics.
- E. Division 7 - Thermal and Moisture Protection.

- F. Section 07900 - Joint Sealers: Sealing of exterior and interior floor, wall, ceiling, and roof penetrations and fixture perimeters exposed after finished installation.
- G. Division 9 - Finishes.
- H. Section 09900 - Painting: Painting of conduit, insulation, ductwork, accessories, etc.
- I. Section 15400 - Plumbing: Gas piping and final connections for fuel-fired equipment.
- J. Division 16 - Electrical: Electrical line voltage wiring (100 volts and greater) connections and equipment starters and disconnects.

#### 1.04 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 the 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 the contractor from furnishing such detail in full and proper manner.
- B. The drawings show various details indicating the general arrangement of the heating and ventilating work, sizes, locations of 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, 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.

#### 1.05 QUALITY ASSURANCE

- A. Perform work in accordance to State of Wisconsin and industry standards.
- B. Qualification of Installer:
  - 1. Company specializing in performing the work of this section with minimum 3 years' documented experience.
  - 2. For the actual fabrication, installation, and testing, adjusting, and balancing of heating and ventilating work, use only thoroughly trained and experience workers completely familiar with the items required and manufacturer's current recommended methods of installation.
  - 3. In acceptance or rejection of installed work, the architect or engineer shall make no allowance for lack of skill on part of the workers.

- C. Qualification of Manufacturer:
  - 1. Company specializing in manufacturing the products specified in this section with minimum 10 years documented experience.
- D. Codes and Regulations:
  - 1. In addition to complying with the specified requirements, comply with pertinent regulations of state or local governmental agencies having jurisdiction, including building codes and local ordinances.
  - 2. 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.
- E. Report Forms: Testing, adjusting, and balancing - AABC MN-1 National Standards for Total System Balance forms, forms prepared following ASHRAE 111, or NEBB forms.
- F. The following standards, referred hereafter by basic designation only, are imposed, as applicable to work in each instance, and form a part of this specification to the extent indicated by the reference thereto:
  - 1. AABC - Associated Air Balance Council
  - 2. ARI - Air Conditioning and Refrigeration Institute
  - 3. ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers
  - 4. ASME - American Society of Mechanical Engineers
  - 5. ASTM - American Society of Testing and Materials
  - 6. IBC - International Building Code, 2009 edition, and all referenced standards with State of Wisconsin amendments
  - 7. IEC - International Energy Code, 2009 edition, and all referenced standards with State of Wisconsin amendments
  - 8. IMC - International Mechanical Code, 2009 edition, and all referenced standards with State of Wisconsin Amendments
  - 9. MCA - Mechanical Contractors Association
  - 10. MSS - Manufacturers Standardized Society
  - 11. NEC - National Electric Code
  - 12. NEMA - National Electrical Manufacturers Association
  - 13. NFPA - National Fire Protection Association
  - 14. SMACNA - Sheet Metal and Air Conditioning Contractors National Association

#### 1.06 PERMITS

- A. The contractor shall obtain and pay for all construction permits required for work of this section.
- B. One copy of all permits shall be provided to owner.
- C. One copy of all permits shall be maintained on site.

## 1.07 COORDINATION

- A. Cooperate and coordinate with other trades to assure that all systems in the work of this section 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 7 foot overhead clearance. Provide maximum clearances wherever 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 that must slope for drainage.

## 1.08 SUBMITTALS

- A. Contractor shall be 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.
- B. Contractor will be responsible for all figures and dimensions. Approval of shop drawings describing equipment that cannot fit in the space allotted does not relieve the contractor from providing equipment that will meet the space requirements.
- C. Shop Drawings: Include data on physical dimensions, gauges, materials of construction and capacities.
  - 1. Mechanical Insulation: Product description, list of materials, and thickness for each service or equipment scheduled and locations.
  - 2. Controls: Written detailed operational description of system.
  - 3. Identification: Submit schedule of labels.
- D. Product Data:
  - 1. Louvers, Grilles: Manufacturer's catalog information with sizes, capacities, rough-in requirements, and finishes.
  - 2. HVAC Equipment: Submit dimensions, connections, arrangement, accessories, and capacities.
  - 3. Air Distribution: Submit materials and connections to other work. Submit catalog performance ratings, construction, electric and duct connections, flashing and dimensions for fans and exhausters.
  - 4. Controls: Submit description and engineering data for each control system component. Submit data for each system component.
  - 5. Identification: Submit description, dimensions, and materials.

- E. Test Reports: Testing, adjusting, and balancing - submit prior to final acceptance and for inclusion in operating and maintenance manuals. Assemble in soft cover, letter size, 3-ring binder, with table of contents page and tabs, and cover identification. Include reduced scale drawings with air outlets and equipment identified with data sheets, and indicating thermostat locations.

#### 1.09 DELIVERY, STORAGE, AND HANDLING

- A. Accept equipment on site in factory packaging. Inspect for damage.

#### 1.10 ENVIRONMENTAL REQUIREMENTS

- A. Do not install insulation and related products when ambient temperatures and conditions are not meeting manufacturer's requirements.
- B. Maintain temperature before, during, and after installation for a minimum period of 24 hours.

#### 1.11 EXTRA MATERIALS

- A. Provide two sets of extra filters for each filter section.
- B. Provide one extra belt for each belt driven motor.

#### 1.12 WARRANTY

- A. Heat Exchangers: Furnish 5 year warranty.

#### 1.13 CLOSEOUT SUBMITTALS

- A. Section 01700 - Execution Requirements: Submittal provisions.
- B. Project Record Documents: Record actual location of equipment, ductwork, and controls including thermostats remotely located from equipment in pipes, ducts, and walls.
- C. Operation and Maintenance Data:
  - 1. Controls:
    - a. Systems descriptions, set points, and controls settings and adjustments.
    - b. Inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.
    - c. Interconnection wiring diagrams complete field installed systems with identified and numbered system components and devices.
  - 2. Equipment: Submit for each piece of equipment.



## PART 2 PRODUCTS

### 2.01 ELECTRICAL PROVISIONS

- A. Contractor shall consult with the Division 16 before ordering electrical motors, to ascertain correct electrical current characteristics.
- B. Motors: Comply with applicable provisions of the National Electrical Code, NEMA Standards, and Division 16 of these specifications, and as follows, unless otherwise indicated.
  - 1. Phases and Current: up to 1/3 HP, capacitor-start, 120 volt, 60 cycle single-phase; 1/2 HP and larger, squirrel-cage induction NEMA rated 460 volt, three phase, 60 cycle. Provide 2 separate windings on 2 speed three-phase motors. Coordinate with actual current characteristics; refer to Division 16.
  - 2. High Efficiency Motors: All motors 1 HP and larger shall be high efficiency motors meeting or exceeding values test in accordance to IEEE Standards 112, Method B procedures as stated in NEMA MG 1-12.53a.
  - 3. Integral Thermal Overload: on all motors less than 1/2 HP.
  - 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. Type: Motors in airstream shall be totally enclosed; all others shall be open drip-proof; unless noted otherwise.
- C. Starters:
  - 1. Where starters are indicated to be an integral part of equipment furnished by this Section, they shall meet requirements of Division 16 and shall be connected under Division 16.
  - 2. All starters not provided integral with equipment shall be provided and installed under Division 16.
- D. Disconnects:
  - 1. Where disconnects are provided as an integral part of equipment furnished by this Section, they shall meet requirements of Division 16 and shall be connected under Division 16.
  - 2. All disconnects not integral with equipment shall be provided and installed under Division 16.

- E. General Wiring: Comply with applicable provisions of Division 16 Section.

### 2.02 SLEEVES

- A. Sleeves for pipes through non-fire rated, walls, footings, and potentially wet floors: Steel pipe or 18 gauge thick galvanized steel.

- B. Sleeves shall be of sufficient length to pass through entire floor or wall construction, including plaster, finished floor, etc., as applicable. Sleeves through floors shall extend 1 inch above finished floor level.
- C. All sleeves shall be of sufficient diameter such that the bare or insulated duct or pipe, as applicable, with unbroken covering, where specified, can pass through and allow for expansion and contraction in all directions.
  - 1. Uninsulated: Provide sleeves two inches larger than the duct or two pipe sizes larger than the pipe passing through; or provide a minimum of ½ inch clearance between inside of sleeve and outside of the duct or pipe.
  - 2. Insulated: Provide sleeves of adequate size to accommodate the full thickness of covering, with clearance for packing and caulking.

## 2.03 FANS

- A. Furnish fans in the size, capacity, and type as scheduled on the drawings.
- B. Fans shall be quiet operating and vibration free.
- C. Fans shall be UL Listed and CSA approved.
- D. The fan shall bear the AMCA Certified Ratings Seal for both sound and air performance.
- E. Fan shall bear a permanently affixed manufacturer=s engraved metal nameplate containing the model number and individual serial number for future identification.
- F. Centrifugal exhaust fans:
  - 1. Spun aluminum upblast centrifugal type.
    - a. The fan wheel shall be centrifugal backward inclined, constructed of aluminum and shall include a wheel cone carefully matched to the inlet cone for precise running tolerances. Wheels shall be statically and dynamically balanced. The fan housing shall be constructed of heavy gauge aluminum with a rigid internal support structure.
    - b. Fresh air for motor cooling shall be drawn into the motor compartment free of discharge contaminants. Motors shall be readily accessible for maintenance.
    - c. A disconnect switch shall be factory installed and wired from the fan motor to a junction box within the motor compartment.
  - 2. Belt Driven:
    - a. Motors shall be heavy duty ball bearing type, carefully matched to the fan load. Drive frame assembly shall be constructed of heavy gauge steel. Motors and drives shall be mounted on vibration isolators, out of the air stream.
    - b. Precision ground and polished fan shafts shall be mounted on permanently sealed, lubricated pillow block ball bearings. Bearings shall be selected for a minimum (L10) life in excess of 100,000

hours at maximum catalogued operating speed. Drives shall be sized for a minimum of 150% of driven horsepower. Pulleys shall be of the cast type, keyed and securely attached to the wheel and motor shafts.

- c. Motors pulleys shall be adjustable for final system balancing. A conduit chase shall be provided through the base to the motor compartment for ease of wiring.
  - d. High efficiency motor.
  - e. Aluminum bird screen.
  - f. Bearings with grease zerk.
  - g. Grip notch belt.
  - h. Greenheck Model CUBE.
3. Roof Mounting:
- a. Roof Curb:
    - 1) Designed for non-insulated roof decks.
    - 2) Type appropriate for ridge roof installation.
    - 3) Galvanized 18 gauge steel, welded construction, with 1 inch, 3 pound density, insulation.
    - 4) Greenheck Model GPFR.
4. Finish (fan and curb): Kynar 500/Hylar 5000.
- a. Design based on Greenheck: Forest Green GF117

## 2.04 GAS FIRED FORCED-AIR FURNACE

- A. See schedule on Drawings for manufacturer, model, and capacity.
- B. Self-contained, packaged, factory assembled, sealed combustion, direct vent, pre-wired unit consisting of cabinet, supply fan, heating element, controls, air filter and accessories; wired for single power connection with control transformer.
  - 1. Air Flow Configuration: See drawings.
  - 2. Fuel: Natural gas fired.
- C. Cabinet: Steel with baked enamel finish, easily removed and secured access panels with safety interlock switches, insulation.
- D. Supply Fan: Centrifugal type rubber mounted with direct or belt drive, adjustable variable pitch motor pulley.
- E. Motor: 1750 rpm variable speed, permanently lubricated.
- F. Heat Exchanger: Aluminized steel crimped or welded construction.
- G. Gas Burner:
  - 1. Atmospheric type with adjustable combustion air supply.
  - 2. Two stage gas valve provides 100 percent safety gas shut-off; 24 volt combining pressure regulation, safety ignition system, manual On-Off valve, pilot filtration, automatic electric valves.

3. Electronic or pilot ignition, with hot surface igniter.
  4. Corrosion resistant combustion air blower with permanently lubricated motor.
- H. Gas Burner Safety Controls:
1. Flame rollout switch: Installed on burner box and prevents unsafe operation.
  2. Blocked Vent shutoff system: Temperature sensor installed on draft hood and prevents operation, manual reset.
  3. Limit Control: Fixed stop at maximum permissible setting, de-energizes burner on excessive outlet air temperature, automatic resets.
- I. Operating Controls:
1. Programmable Thermostat: Cycles furnace system on and off to maintain room temperature setting.
  2. Supply Fan Control: Energize from outlet air temperature or timer device independent of burner controls, with adjustable timed off delay and fixed timed on delay, with manual switch for continuous fan operation. Provide for continuous low speed fan operation.
- J. Air Filters: 1-inch (25 mm) thick polyurethane, glass fiber, disposable type arranged for easy replacement.
- K. Gas Vent: Per manufacturer's requirements.
- L. Performance:
1. Ratings: Seasonal Efficiency Rating not less than requirements of ASHRAE 103.
  2. Refer to Furnace Schedule. Gas heating capacities are sea level ratings.
- M. Acceptable Manufacturers:
1. Airstrong Air Conditioning.
  2. Carrier Corp.
  3. The Trane Company.
  4. Substitutions: per Section 01600.

## 2.05 DUCTWORK

- A. Materials:
1. Steel Ducts: Galvanized steel sheet, lock-forming quality.
  2. Sealant: Non-hardening, water resistant, fire resistive, used alone or with tape.
- B. Metal Ductwork:
1. Fabricate and support in accordance to SMACNA HVAC Duct Construction Standards - Metal and Flexible; except as indicated on Drawings.

2. Construct T's, bends, and elbows with radius of 1 1/2 times the width of the duct on centerline. Where not possible, furnish turning vanes.
3. Increase duct sizes gradually, not exceeding 30 degrees divergence and 45 degrees convergence.

C. Duct Accessories:

1. Volume Control Dampers:
  - a. Fabricate in accordance to SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated on Drawings.
  - b. Fabricate single blade dampers for duct sizes to 12 inches by 30 inches.
  - c. Fabricate multi-blade damper of opposed blade pattern with maximum blade sizes of 8 inches by 72 inches. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
  - d. Except in round ductwork 12 inches and smaller, furnish end bearings.
  - e. Furnish locking, indicating quadrant regulators on single and multi-blade dampers. Where width exceeds 30 inches, furnish regulator at both ends.
2. Turning Devices:
  - a. Multi-blade device with blades aligned in short dimension; steel or aluminum construction; with individually adjustable blades, mounting straps.
3. Flexible Duct Connections:
  - a. UL listed fire-retardant neoprene coated woven glass fiber to NFPA 90A, approximately 3 inches wide, crimped into metal edging strip.
4. Duct Access Doors:
  - a. Fabricate in accordance to SMACNA HVAC Duct Construction Standards - Metal and Flexible.
  - b. Access doors smaller than 12 inches square secured with sash locks. Access doors with sheet metal screw fasteners are not acceptable.

## 2.06 AIR INLETS AND OUTLETS

A. Exterior Louver:

1. Furnish louver in the size, thickness, free area, and type as scheduled on the drawings.
2. Finish: Kynar 500/Hylar 5000. Color design based on Greenheck: Hampton Brown GF105.
3. 4 inch Deep Louver Construction:
  - a. Frame shall be heavy gauge 6063T5 extruded aluminum, 4 inch by 0.081 inch nominal dimensions.
  - b. Blade shall be J style, 6063T5 extruded aluminum, 0.081 inch nominal wall thickness, positioned at 37E and 45E angles on approximately 4 inch centers.
  - c. Greenheck Model ESD-403.

4. Screen: Flattened expanded aluminum in removable frame. Provide bird screen for all exhaust service louvers and insect screen for all intake service louvers.
  5. Extended sill, same construction and finish as louver.
- B. Supply and Return:
1. Wall and duct mounted louvered grille.
    - a. Supply:
      - 1) Construction:
        - a) Double deflection. Front blades parallel to floor.
        - b) Aluminum. Price 620.
    - b. Return:
      - 1) Construction:
        - a.) ½ inch blade spacing. Blades parallel to floor.
        - b.) Aluminum. Price 635.
    - c. Frame: Surface mount border with countersunk screw holes.
    - d. Finish: Baked enamel. White.
- C. Acceptable manufacturers: Greenheck, Carnes, SESCO, or approved equal.

## 2.07 FILTERS

- A. Filters:
1. Disposable Panel Filters: Fiber blanket, factory sprayed with flameproof, non-drip, non-volatile adhesive.
  2. Thickness: 2 inch.
  3. Casing: Galvanized steel frame with expanded metal grid on outlet side and steel rod grid on inlet side.
  4. Efficiency: 30% minimum.
  5. Performance Rating: 500 FPM face velocity.
- B. Acceptable manufacturers: Eco-Air, Purolator, or an approved equivalent.

## 2.08 ACTUATED DAMPERS

- A. Furnish damper in size, thickness, and type as scheduled on drawings.
- B. All dampers shall be of insulated, low leakage design with linkages out of the airstream.
- C. Insulated Type:
1. Frame: Extruded aluminum (6063TS) of not less than 0.080 inch in thickness.
  2. Thermal Break: Entire frame shall be thermally broken by means of polyurethane resin pockets complete with thermal cuts.
  3. Blades: Extruded aluminum profiles, internally insulated with non-CFC, expanded polyurethane foam and thermally broken.

4. Seals: Blade and frame seals shall be extruded silicone and secured in an integral slot within the aluminum extrusions.
5. Tamco model 9000.
6. Acceptable Manufacturers: AlumaVent, Arrow, Greenheck, or Tamco. No substitutions.

## 2.09 DUCTWORK INSULATION

- A. Flexible Glass Fiber: ASTM C553; flexible, noncombustible blanket.
  1. k (ksi) Value: 0.29 at 75 degrees F.
  2. Vapor Retarder Jacket: Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, secured with pressure sensitive tape.
- B. Canvas Jacket: UL listed fabric, 6 oz/sq yd, plain weave cotton treated with dilute fire retardant lagging adhesive.
- C. Schedule:
  1. Installer's option where more than one type is indicated.
  2. Exhaust Ducts, Exposed to Outdoor Air:
    - a. Flexible Glass Fiber: 2 inches thick.
  3. Combustion Air Ducts:
    - a. Flexible Glass Fiber Insulation: 2 inches thick.
  4. Outside Air Intake Ducts:
    - a. Flexible Glass Fiber Insulation: 2 inches thick.
  5. Jackets:
    - a. Insulated ducts exposed in storage room: Canvas.

## 2.10 PROGRAMMABLE THERMOSTATS

- A. Manufacturers: Thermostat to be provided by or approved by furnace manufacturer.
- B. Programmable Thermostat: Low voltage, to control heating system on and off operation, heater stages in sequence with delay between stages, and supply fan to maintain temperature setting and occupancy schedule.
- C. Electric solid-state microcomputer based room thermostat with remote sensor.
  1. 2-stage heating.
  2. Preferential rate control to minimize overshoot and deviation from setpoint.
  3. Fan to run continuous during all occupied periods.
  4. Override of unoccupied period for timed period from one to four hours.
  5. Short cycle protection.
  6. Programming based on weekdays, Saturday and Sunday (7-day).
  7. Set-up for occupied/unoccupied periods for each day.
  8. Selection features including degree F display, 24-hour clock, remote sensor, fan on-auto.
  9. Battery replacement without program loss.

10. Thermostat display:
  - a. Time of day.
  - b. Actual room temperature.
  - c. Programmed temperature.
  - d. Programmed time.
  - e. Duration of timed override.
  - f. Day of week.
  - g. System mode indication: heating, auto, occupied, unoccupied, off.

## 2.11 CONTROLS

- A. Contractor shall be responsible for all automatic electric controls for HVAC equipment as indicated on the plans and as described herein.
- B. Furnish all motorized dampers, protected relays, interlocks, and transformers as required. Contractor shall mount same in suitable control panels, occupied space, or on equipment as required, specified herein, or shown on drawings. Furnish low voltage relays as required for all fans and motors automatically controlled.
- C. Furnish necessary wiring diagrams and be responsible for obtaining proper working installation. Furnish all multi-speed switches and control apparatus.
- D. Damper Operators:
  1. Furnish and install commercial quality damper actuators for all dampers requiring operators.
  2. Actuator type, which meet requirements of operation described in the sequence of control.
  3. Furnish proportional control with sufficient power for air velocities 20 percent greater than maximum design velocity and to seal against maximum system pressures.
  4. Electric Operators: Adjustable stroke motor with spring, having oil immersed gear train
  5. Acceptable Manufacturer: Belimo.
- E. Input/Output Sensors:
  1. Temperature:
    - a. Resistance temperature detectors with insertion or averaging elements in ducts and insertion elements for liquids with brass socket.
    - b. Room sensors: Locking cover.
    - c. Outside air sensors: Watertight inlet fitting shielding from direct rays of sun.
  2. Static Pressure Sensors:
    - a. Unidirectional with ranges not exceeding 150 percent of maximum expected input, temperature compensated with one percent of full-scale accuracy.



- 3. Equipment Operation Sensors:
  - a. Status Inputs for Fans: Differential pressure switch.
  - b. Status Inputs for Electric Motors: Auxiliary contactor or current sensing relay with current transformer.
- F. Relays: Furnish necessary relays to interlock motorized fresh air dampers with occupied/unoccupied scheduling, as well as related control of fan and exhaust fan operation.

## 2.12 FLASHING AND TRIM

- A. Provide all opening trim as shown on drawings and as required for a complete and weather-tight installation.

## 2.13 IDENTIFICATION

- A. Furnish adequate marking of exposed accessible HVAC equipment, ductwork and control devices, per ANSI A13.1.
- B. Mechanical Identification:
  - 1. Plastic Nameplates: Laminated three-layer plastic with engraved black letters on light background color.
  - 2. Plastic Tags: Laminated three-layer plastic with engraved black letters on light background color, minimum 1 1/2 inches diameter.
  - 3. Acceptable Manufacturer: Seton Nameplate Corporation.

## 2.14 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 engineer.
- B. Formed steel channels: Galvanized 12 gauge thick steel. With holes 1 1/2 inches on center.
- C. 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.
- D. Prime coat paint all supports.

## PART 3 EXECUTION

### 3.01 JOB CONDITIONS

- A. Section 01300 - Administrative Requirements: Coordination and project conditions.

- B. Surface Conditions: Examine the areas and conditions under which the 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.
- C. Cooperate as necessary with other trades in order that all system 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 access to each system.
- D. Measurements:
  - 1. Field measure existing conditions.
  - 2. Lay out work, properly locate all apparatus, ductwork, equipment, etc. Adjust work, as necessary, to ensure that work shall fit into the spaces that have been allotted for such work. Due regard shall be taken for the work of other trades.
- E. Proceed as rapidly as the building construction will permit.
- F. Start of work means acceptance of existing conditions.

### 3.02 ELECTRICAL PROVISIONS

- A. Control Wiring:
  - 1. Exposed low voltage (less than 100 volts) control wiring in connection with work of this section shall be in strict accordance with the applicable sections of Division 16.
  - 2. All control wiring shall be less than 100 volts, unless noted otherwise. If contractor opts to install control wiring of 100 volts or over, contractor shall contract with a certified electrical contractor for its installation.
- B. Division 16: All line voltage (100 volts and greater) electrical wiring connections. Certain equipment connections have been assumed to be over 100 volts, see Electrical Drawings.
- C. Furnish complete list and location of equipment requiring electrical connections and necessary wiring diagrams to Division 16.

### 3.03 INSTALLATION - GENERAL

- 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 4 feet 0 inch 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.
- C. Interferences: Avoid interference with structure, and with work of other trades, preserving adequate headroom and clearing all doors and passage ways.

- D. 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.
- E. Section 07900: Caulk around the exterior perimeter of exterior equipment and where called for on the drawings in areas visible after finished construction.
- F. General: All dampers, equipment, and accessories shall be installed to permit access to equipment for maintenance, servicing, or repairs. Relocation of ducts or equipment to accomplish equipment access shall be completed by the contractor, at no additional cost to the owner.
- G. Provide access doors where equipment is located in chases or inaccessible locations. Access panels shall be furnished by the contractor and installed by the specific trade responsible for the material in which the access panels are installed.

### 3.04 FLOOR, WALL, ROOF, AND CEILING OPENINGS

- A. All openings for work of this section shall be provided under other sections. Openings shall be made as necessary in ceiling, floors, walls, etc., as required to permit the installation of work specified or shown on the drawings. Openings shall be made with care to avoid damage which cannot be concealed when work is completed.
- B. Provisions for openings and holes and clearances through walls, floors, and ceilings to be made in advance of construction of such parts of the building. Contractor is responsible for the correct size and location of these openings.

### 3.05 INSTALLATION - SLEEVES

- A. Provide and install sleeves wherever ductwork passes through floors, walls, partitions, etc.
- B. Sleeves shall be set and maintained in place during the progress of the work. Set sleeves in position in forms. Set sleeves in place before concrete is placed. Provide reinforcing around sleeves.
- C. Sleeves shall be securely fastened in place.
- D. Extend sleeves through floors 1 inch above finished floor level.
- E. Where ductwork penetrates floor, ceiling, or wall, close off space with stuffing insulation to within 1/2 inch of wall face.
- F. Caulk the space between the sleeve and duct for all sleeves and penetrations not visible after finished installation.

- G. Section 07900: Caulking of all sleeves and penetrations visible after finished installation.
- H. Provide close fitting metal collar, escutcheon cover, or plate wherever hanger rods are exposed to view and pass through floor, wall, ceiling, partition, or similar locations. Hold escutcheons in place with set screw.

### 3.06 INSTALLATION - DUCTWORK

- A. Examination:
  - 1. Verify sizes of equipment connections before fabricating transitions
  - 2. Verify ducts and equipment installation are ready for accessories.
  - 3. Check location of air outlets and inlets and make necessary adjustments in position to conform to architectural features, symmetry, and lighting arrangements.
- B. Installation:
  - 1. Install in accordance to State of Wisconsin Standards.
  - 2. Metal Ducts: Install in accordance to SMACNA Duct Construction Standards - Metal and Flexible.
  - 3. Connect flexible ducts to metal ducts with liquid adhesive plus sheet metal screws.
  - 4. Use crimp joints with or without bead for joining round duct sizes to 8 inches and smaller with crimp in direction of airflow.
  - 5. Install flexible connections immediately adjacent to fans and motorized equipment. Install flexible connections specified between fan inlet and discharge ductwork. Prevent flexible connectors being in tension while running.
  - 6. Install back-draft dampers on discharge of exhaust fans, except where actuated dampers are installed, and as indicated on Drawings.
  - 7. Prevent passage of unfiltered air around filters by installing felt, rubber, or neoprene gaskets.
  - 8. Cut openings in ductwork to accommodate thermometers and controllers. Cut pitot tube openings for testing of systems, complete with metal can with spring device or screw to eliminate against air leakage.
  - 9. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities. Apply duct insulation.
  - 10. During construction install temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
  - 11. Install duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, and elsewhere as indicated on Drawings. Install minimum 8 inch by 8 inch size for hand access, 18 inch by 18 inch for shoulder access.
  - 12. Support terminal units individually from structure. Do not support from adjacent ductwork. Install with minimum of 5 feet of 2 inch thick lined ductwork downstream of unit.

13. Install balancing dampers on duct take-off to grilles and louvers, regardless of whether dampers are specified as part of the louver or grille assembly.
14. Paint ductwork visible behind air outlets and inlets matte black in accordance to Section 09960.
15. Do not operate fans until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

### 3.07 INSTALLATION - FANS

- A. Install fans with resilient mountings and flexible electrical leads.
- B. Install sheaves required for final air balance.
- C. Install safety screen where fan inlet or outlet is exposed.
- D. Install fans with access to adjustable blade axial fan wheels for varying blade angle setting. Adjust blades for varying range of volume and pressure.

### 3.08 INSTALLATION - FURNACES

- A. Install flexible duct connections on inlet and outlet of furnaces.
- B. Install control wiring between unit and remotely mounted components and thermostats.

### 3.09 INSTALLATION - GAS VENTS

- A. Install continuously from appliance.
- B. Maintain UL listed minimum clearances from combustibles. Assemble pipe and accessories for complete installation.
- C. Install vent dampers, locating close to draft hood collar, and secured to breeching.

### 3.10 INSTALLATION - CONTROLS

- A. After completion of installation, test and adjust control equipment. Submit data showing set points and final adjustments of controls.
- B. Install panels and other hardware in position on permanent walls not subject to excessive vibration.

### 3.11 TESTING, ADJUSTING, AND BALANCING

- A. Examination:
  1. Before starting work, verify systems are complete and operable.
  2. Report defects, deficiencies, or abnormal conditions in mechanical systems preventing system balance.
  3. Beginning of work means acceptance of existing conditions.

- B. Installation Tolerances:
  - 1. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent for exhaust systems.
  - 2. Air Outlets and Inlets: Adjust to within plus or minus 10 percent of design.
- C. Air System Procedure:
  - 1. Adjust air handling and distribution systems to deliver design supply and exhaust air quantities within previously stated tolerances.
  - 2. Make air quantity measurements in ducts by traverse of entire cross sectional area of duct.
  - 3. Measure air quantities at air inlets and outlets.
  - 4. Use volume control devices to regulate air quantities only to extent those adjustments do not create objectionable air motion or sound levels. Change volume using dampers mounted in ducts.
  - 5. Vary total system air quantities by adjustment of fan speeds. Provide drive changes to accomplish system air flow. Vary branch air quantities by damper regulation.
  - 6. Measure static pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across fan. Allow for pressure drop equivalent to 50 percent loading of filters.
  - 7. Measure temperature conditions across outside air and exhaust air dampers to check leakage.
- D. Field Quality Control:
  - 1. Verify recorded data represents actually measured or observed conditions.
  - 2. Permanently mark settings of damper or other adjustment devices. Set and lock memory stops.

### 3.12 MECHANICAL IDENTIFICATION

- A. Install adequate marking of exposed accessible HVAC equipment, ductwork and control devices, per ANSI A13.1.
- B. Install plastic nameplates with adhesive.
- C. Install plastic tags with corrosion resistant metal chain.
- D. Equipment:
  - 1. Identify all major HVAC equipment with plastic nameplates minimum 1 1/2 inches high. Lettering size and plate length to be sufficient to convey adequate information at each location. Minimum length: 4 inches. Minimum lettering height: 3/8 inch.
  - 2. Control Equipment: 1 1/2 inch by 4 inch plastic nameplates with 1/4 inch high lettering.

### 3.13 PAINTING

- A. Section 09900: Painting of concealed ductwork where indicated and exposed piping, ductwork, and equipment, without factory finish or finished cover.
- B. Touch-up all factory finishes damaged during construction.

### 3.14 CLEANING

- A. 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.
- B. High efficiency furnaces must not operate without adequate filters to prevent plugging secondary coils. Contractor is responsible for cleaning secondary coil, if necessary, prior to turning over to owner.

### 3.15 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 this contract until work is accepted by the owner.
- 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.

### 3.16 INSTRUCTIONS

- A. Instruct owner's representative in the operation and maintenance of all mechanical systems.
- B. Assemble two complete sets of manufacturer's printed operating and maintenance instructions for all mechanical equipment installed under the contract. Prepare in bound copies with index tabs. Information must include parts list and wiring diagrams. Submit to engineer for presentation to the owner.

### 3.17 CLOSEOUT OPERATIONS

- A. Section 01700 - Execution Requirements: Closeout provisions.
- 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 item 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 expendable items of the work.
- C. Instruction, O&M: Instruct owner or 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 an operating engineer, who is completely familiar with work, to consult with and continue training the owner's personnel on an as-needed basis.
- F. Extra Materials.
- G. Record Drawings.

### 3.18 SEQUENCE OF OPERATION

- A. Fans:
1. F-1: Control with thermostat T-1. Interlock control with damper DF-1, damper DL-1, and sensor S-1.
    - a. Whenever thermostat is in "occupied" or "override" mode, fan shall be activated.
    - b. Whenever thermostat is in "unoccupied", fan shall be deactivated.
- B. Heaters:
1. H-1: Control with thermostat T-1. Interlock with sensor S-1.
    - a. Furnace blower shall run continuous during all "occupied" and "override" periods. During "unoccupied" periods, furnace blower, along with heating, shall cycle on and off to maintain room temperature within set point range.
    - b. Two-stage heating with a single speed fan.
    - c. Internal controls.
- C. Thermostats:
1. T-1: Interlock with heater H-1, fan F-1, damper DF-1, and damper DL-1.
    - a. Remote programmable room thermostat.
    - b. Thermostat shall modulate gas valve to maintain room temperature within set point range.



- c. Set points: Minimum 55° F; maximum 95°F.
  - d. Range: 3 to 5 degrees F.
- D. Sensors:
  - 1. S-1: Interlock with heater H-1 and fan F-1.
    - a. Duct mounted.
    - b. Smoke detector.
    - c. When detector is activated by the presence of smoke, heater and fan shall be deactivated.
- E. Dampers:
  - 1. DF-1: Control with thermostat T-1. Interlock with fan F-1.
    - a. Two-position actuated damper.
    - b. Operation: Power open, spring close.
    - c. When fan is activated, damper shall be in 100% open position. Damper need not be in 100% open position for fan to be activated.
    - d. When fan is deactivated, damper shall be in 100% closed position. Damper need not be 100% closed for fan to deactivate.
  - 2. DL-1: Control with thermostat T-1. Interlock with fan F-1.
    - a. Two-position actuated damper.
    - b. Operation: Power open, spring close.
    - c. When fan is activated, damper shall be in 100% open position. Damper need not be in 100% open position for fan to be activated.
    - d. When fan is deactivated, damper shall be in 100% closed position. Damper need not be 100% closed for fan to deactivate.

END OF SECTION

## **24. Restroom Facility Electrical, Item SPV.0105.04.**

### **A Description.**

This item shall include all wiring and electrical equipment in the restroom building as shown on the Restroom Building Electrical Plan Drawing and the Restroom Building Schedule drawing. The attached Section 16000 Electrical Specification attached, shall apply to all electrical work in the Restroom Building.

### **B Materials**

See the specifications below.

### **C Construction**

All electrical wiring in the Restroom Building shall be per the 16000 Section of the specification. All wiring in the building shall be in EMT metal conduit and shall be recessed in finished areas. (Toilet rooms, entry, and storage area are finished areas; mechanical room is not.)

### **D Measurement**

The department will measure Restroom Facility Electrical as a lump sum unit of work, acceptably completed.

### **E Payment**

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.04	Restroom Facility Electrical	LS

Payment is full compensation for furnishing and installing all electrical equipment per the plan drawings and specifications, for testing the equipment. It shall include all labor and installation equipment necessary to complete the work.

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## DIVISION 16 - ELECTRICAL

### SECTION 16000

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## SECTION 16010

### BASIC ELECTRICAL REQUIREMENTS

#### PART 1 - GENERAL

##### 1.01 GENERAL

- A. Applicable provisions of the DOT standard specifications shall apply to this section.

##### 1.02 SCOPE

- A. Basic Electrical Requirements that are applicable to all Division 16 sections. This section includes information common to two or more technical specification sections or items that are of a general nature, not conveniently fitting into other technical sections.

##### 1.03 REFERENCE STANDARDS

- A. Abbreviations of standards organizations referenced in this and other sections are as follows:

ANSI American National Standards Institute  
ASTM American Society for Testing and Materials  
DOT State of Wisconsin Department of Transportation  
EPA Environmental Protection Agency  
ETL Electrical Testing Laboratories, Inc.  
IBC International Building Code  
IEEE Institute of Electrical and Electronics Engineers  
IES Illuminating Engineering Society  
ISA Instrument Society of America  
NBS National Bureau of Standards  
NEC National Electric Code  
NEMA National Electrical Manufacturers Association  
NESC National Electrical Safety Code  
NFPA National Fire Protection Association  
UL Underwriters Laboratories, Inc.

##### 1.04 REGULATORY REQUIREMENTS

- A. All work and materials are to conform in every detail to applicable rules and requirements of the International Building Code, the Wisconsin State Electrical Code Volumes 1 and 2, the National Electrical Code (ANSI/NFPA 70), other

applicable National Fire Protection Association codes, the National Electrical Safety Code, and present manufacturing standards (including NEMA).

#### 1.05 QUALITY ASSURANCE

- A. All Division 16 work shall be accomplished under the direction and supervision of a currently certified State of Wisconsin Certified Master Electrician.
- B. Where equipment or accessories are used which differ in arrangement, configuration, dimensions, ratings, or engineering parameters from those indicated on the contract documents, the contractor is responsible for all costs involved in integrating the equipment or accessories into the system and the assigned space, and for obtaining the performance from the system, into which these items are placed.
- C. All materials shall be listed by and shall bear the label of an approved electrical testing laboratory. If none of the approved electrical testing laboratories has published standards for a particular item, then other national independent testing standards, if available, applicable, and approved by A/E, shall apply and such items shall bear those labels. Where one of the approved electrical testing laboratories has an applicable system listing and label, the entire system, except for medium voltage equipment and components, shall be so labeled. The following laboratories are approved for providing electrical product safety testing and listing services as required in these specifications:

Underwriters Laboratories, Inc.  
Electrical Testing Laboratories, Inc.

#### 1.06 PROTECTION OF FINISHED SURFACES

- A. Touch-up paint all scratched/discolored surfaces. Deliver other “loose and detachable parts” to the owner at project completion.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site.
- B. Store and protect products under provisions and according to instructions of respective manufacturer.
- C. Accept products on-site. Inspect and record damage.
- D. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- E. Handle in accordance to respective manufacturer's written instructions.

#### 1.08 SEALING AND FIREPROOFING

- A. Sealing and fireproofing of sleeves/openings between conduits, wireways, troughs, cable, etc. and the structural or partition opening shall be the responsibility of the contractor whose work penetrates the opening. The contractor responsible shall hire individuals skilled in such work to do the sealing and fireproofing. Individuals hired shall normally and routinely be employed in the sealing and fireproofing occupation.

#### 1.09 INTENT

- A. The contractor shall furnish and install all the necessary materials, apparatus, and devices to complete the electrical equipment and systems installation herein specified, except such parts as are specifically exempted herein.
- B. If an item is either called for in the specifications or shown on the plans, it shall be considered sufficient for the inclusion of said item in this contract. If a conflict exists within the Specifications or exists within the drawings, the contractor shall furnish the item, system, or workmanship which is the highest quality, largest, or most closely fits the owner's intent (as determined by the DOT Project Representative).
- C. It must be understood that the details and drawings are diagrammatic. The contractor shall verify all dimensions at the site and be responsible for their accuracy.
- D. All sizes as given are minimum except as noted.
- E. Materials and labor shall be new (unless noted or stated otherwise), first class, and workmanlike, and shall be subject at all times to the DOT's inspections, tests, and approval, from commencement to acceptance of the completed work.
- F. Whenever a particular manufacturer's product is named, provide the named product. Substitutions will be allowed with the AE/DOT project representative's approval only. Whenever products are specified by reference standards, provide any product meeting the standards.

#### 1.10 OMISSIONS

- A. The contractor shall call the attention of the A/E to any materials or apparatus the contractor believes to be inadequate, and to any necessary items of work omitted, no later than ten days prior to bid opening.

## 1.11 SUBMITTALS

- A. The successful bidder shall furnish submittals to the DOT in accordance to these specifications. See the list below, as well as individual technical sections, for items requiring submittal.

Disconnect Switches  
Lighting Fixture Ballasts  
Time Clocks

Panelboards  
Lighting Fixtures  
Wiring Devices

- B. Submit information for all equipment and systems as indicated in the respective specification sections, marking each submittal with that specification section number. Mark general catalog sheets and drawings to indicate specific items being submitted and proper identification of equipment by name and/or number, as indicated in the contract documents. Failure to do this may result in the submittal(s) being returned to the contractor for correction and resubmission. Failing to follow these instructions does not relieve the contractor from the requirement of meeting the project schedule.
- C. On request from the A/E, the successful bidder shall furnish additional drawings, illustrations, catalog data, performance characteristics, etc.
- D. Submittals shall be grouped to include complete submittals of related systems, products, and accessories in a single submittal. Mark dimensions and values in units to match those specified. Include wiring diagrams of electrically powered equipment.
- E. Submittals must be approved before fabrication is authorized.
- F. Provide sufficient quantities of submittals to allow the following distribution:

Operating and Maintenance Manuals	2 copies
Owner	2 copies
A/E	1 copy
Contractor(s)	as required

## 1.12 WORK BY OTHER TRADES

- A. Every attempt has been made to indicate in this trade's specifications and drawings all work required of this contractor. However, there may be additional specific paragraphs in other trade specifications and addenda, and additional notes on drawings for other trades which pertain to this Trade's work, and thus those additional requirements are hereby made a part of these specifications and drawings.

- B. Electrical details on drawings for equipment to be provided by others is based on preliminary design data only. This contractor shall lay out the electrical work and shall be responsible for its correctness to match equipment actually provided by others.

#### 1.13 CERTIFICATES AND INSPECTIONS

- A. Obtain and pay for all required State and local installation permits, certificates, and inspections. Include copies of obtained documents in the Operating and Maintenance Manual.

#### 1.14 OPERATING AND MAINTENANCE MANUAL

- A. Assemble material in three-ring or post binders, using an index at the front of each volume and tabs for each system or type of equipment. Include the following information:
  - Copies of all approved submittals.
  - Manufacturer's wiring diagrams for electrically powered equipment.
  - Records of tests performed to certify compliance with system requirements.
  - Certificates of inspection by regulatory agencies.
  - Parts lists for manufactured equipment.
  - Preventive maintenance recommendations.
  - Warranties.
  - Additional information as indicated in the technical specification sections
  - Copies of required State and local permits, certificates, and inspections.

#### 1.15 TRAINING OF OWNER PERSONNEL

- A. Instruct owner's personnel in the proper operation and maintenance of systems and equipment provided as part of this project. Include not less than 2 hours of instruction, using the Operating and Maintenance manuals during this instruction. Demonstrate startup and shutdown procedures for all equipment. All training shall occur during normal working hours at time convenient to the owner.

#### 1.16 RECORD DRAWINGS

- A. The contractor shall maintain at least one copy each of the specifications and drawings on the job site at all times.
- B. The A/E will provide the contractor with a suitable set of contract drawings on which daily records of changes and deviations from contract shall be recorded. All buried or concealed piping, conduit, and similar items shall be located by dimensions and elevations on the record drawings.
- C. The daily record of changes shall be the responsibility of contractor's field superintendent. No arbitrary mark-ups will be permitted.



- D. At completion of the project, the contractor shall submit the marked-up record drawings to the DOT project representative prior to final payment.

## PART 2 - PRODUCTS

### 2.01 NON-RATED PENETRATIONS:

#### A. Conduit and Cable Tray Penetrations:

1. At conduit and cable tray penetrations of non-rated interior partitions, floors and exterior walls above grade, use urethane caulk in annular space between conduit and sleeve, or the core drilled opening.
2. Install escutcheons or floor/ceiling plates where pipe penetrates non-fire rated surfaces in occupied spaces. Occupied spaces for this paragraph include only those rooms with finished ceilings and the penetration occurs below the ceiling

## PART 3 - EXECUTION

### 3.01 CUTTING AND PATCHING

- A. Each trade shall perform cutting and patching necessary for installation of their respective work, unless otherwise noted. cutting and patching shall be performed by skilled technicians experienced with the procedures, equipment, and materials required. patch disturbed surfaces and structures with materials and finishes matching adjacent surfaces and structures.

### 3.02 EQUIPMENT ACCESS

- A. Install all piping, conduit, ductwork, and accessories to permit access to equipment for maintenance. Coordinate the exact location of wall and ceiling access panels and doors with other trades, making sure that access is available for all equipment and specialties. Where access is required in plaster or drywall walls or ceilings, furnish and install.

### 3.03 COORDINATION

- A. The contractor shall cooperate with other trades in locating work in a proper manner. Should it be necessary to raise or lower or move longitudinally any part of the electrical work to better fit the general installation, such work shall be done at no extra cost to the owner, provided such decision is reached prior to actual installation. The contractor shall check location of electrical outlets with respect to other installations before installing.

- B. The contractor shall verify that all devices are compatible for the surfaces on which they will be used. This includes, but is not limited to, light fixtures, panelboards, devices, etc. and recessed or semi-recessed heating units installed in/on architectural surfaces.
- C. Coordinate all work with other contractors prior to installation. Any installed work that is not coordinated and that interferes with other contractor's work shall be removed or relocated at the installing contractor's expense.

#### 3.04 HOUSEKEEPING AND CLEAN UP

- A. The contractor shall clean up and remove from the premises, on a daily basis, all debris and rubbish resulting from its work, and shall repair all damage to new and existing equipment resulting from its work. When job is complete, this contractor shall remove all tools, excess material and equipment, etc., from the site.

END OF SECTION

## SECTION 16111

### CONDUIT

#### PART 1 – GENERAL

##### 1.01 GENERAL

- A. Applicable provisions of the DOT Standard Specifications shall apply to this section.

##### 1.02 SCOPE

- A. Raceways shall be installed as a complete system continuous from service to outlet or equipment, mechanically and electrically connected, constituting a continuous ground system.

#### PART 2 – PRODUCTS

##### 2.01 ELECTRICAL METALLIC TUBING (EMT) AND FITTINGS

- A. Conduit: ANSI C80.3, steel, galvanized tubing.
- B. Fittings: ANSI C80.3, insulated throat; all steel construction, set screw or compression type, compression type. No push-on or indenter types permitted. All set screw fittings larger than 1" shall have hex head type screws-tightened to manufactures' specifications. Set screw fittings 1" and smaller may have slotted type screws-tightened to manufacturer's specifications.
- C. Conduit Bodies: ANSI C80.3, all steel conduit bodies.

##### 2.02 FLEXIBLE METAL CONDUIT AND FITTINGS

- A. Conduit: steel, galvanized, spiral strip.
- B. Fittings and Conduit Bodies: NEMA FB 1, all steel, galvanized, or malleable iron.

##### 2.03 LIQUIDTIGHT FLEXIBLE METAL CONDUIT AND FITTINGS

- A. Conduit: flexible, steel, galvanized, spiral strip with an outer liquidtight, nonmetallic, sunlight-resistant jacket.
- B. Fittings and Conduit Bodies: NEMA FB 1, compression type. There shall be a metallic cover/insert on the end of the conduit inside the connector housing to seal the cut conduit end.

## 2.04 CONDUIT SUPPORTS

- A. See Section 16190

## 2.05 GENERAL

- A. All fittings and conduit bodies for steel conduit shall be galvanized. Cast metal, split or gland type fittings will not be permitted.

## PART 3 – EXECUTION

### 3.01 INSTALLATION

- A. Install conduit in accordance to NECA Standard of Installation No. 5055.

### 3.02 CONDUIT SIZING, ARRANGEMENT, AND SUPPORT

- A. EMT is permitted to be used in sizes 4" (100 mm) and smaller for power and telecommunication systems. See CONDUIT INSTALLATION SCHEDULE below for other limitations for EMT and other types of conduit.
- B. Size power conductor raceways for conductor type installed or for Type THW conductors, whichever results in larger conduit. Conduit size shall be 3/4 inch (19 mm) minimum except as specified elsewhere or with specific engineer's approval for each application. Conduit for all other wiring, including but not limited to data, control, security, fire alarm, telecommunications, signal, video, etc. shall be sized per number of conductors pulled and their cross-sectional area. Maximum conduit fill shall be 40%.
- C. Arrange conduit to maintain headroom and present a neat appearance.
- D. Route exposed conduit, and conduit above accessible ceilings, parallel and perpendicular to walls and adjacent piping.
- E. Maintain minimum 6-inch (150 mm) clearance between conduit and piping. Maintain 12-inch (300 mm) clearance between conduit and heat sources such as flues, steam pipes, and heating appliances.
- F. Arrange conduit supports to prevent distortion of alignment by wire pulling operations. Fasten conduit using galvanized pipe straps, conduit racks (lay-in adjustable hangers), clevis hangers, or bolted split stamped galvanized hangers.
- G. Group conduit in parallel runs where practical and use conduit rack (lay-in adjustable hangers) constructed of steel channel with conduit straps or clamps. Provide space for 25 percent additional conduit.

- H. Do not fasten conduit with wire or perforated pipe straps. Before conductors are pulled, remove all wire used for temporary conduit support during construction.
- I. Support and fasten metal conduit at a maximum of 8 feet (2.4 m) on center.
- J.
- K. Conduit supports shall be independent of the installations of other trades (e.g. ceiling support wires, HVAC pipes, etc.), unless so approved or detailed.
- L. In general, all conduit shall be concealed except where noted on the drawings or approved by the architect/engineer. Contractor shall verify with architect/engineer all surface conduit installations except in mechanical rooms.
- M. Changes in direction shall be made with symmetrical bends, cast steel boxes, stamped metal boxes, or cast steel conduit bodies.
- N. No continuous conduit run shall exceed 100 feet (30 meters) without a junction box.

### 3.03 CONDUIT INSTALLATION

- A. Cut conduit square using a saw or pipecutter; de-burr cut ends.
- B. Conduit shall not be fastened to corrugated metal roof deck.
- C. Bring conduit to the shoulder of fittings and couplings, and fasten securely.
- D. Use conduit hubs for fastening conduit to cast boxes. Use sealing locknuts or conduit hubs for fastening conduit to sheet metal boxes in damp or wet locations. Sheet metal boxes larger than 4-11/16" square shall not contain pre-punched or concentric knockouts.
- E. All conduit terminations (except for terminations into conduit bodies) shall use connectors or conduit hubs with one locknut, or shall use double locknuts (one each side of box wall) and insulating bushing. Provide bushings for the ends of all conduit not terminated in box walls. Refer to Section 16170-Grounding and Bonding for grounding bushing requirements.
- F. Install no more than the equivalent of four 90-degree bends between boxes.
- G. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 2-inch (50 mm) size unless sweep elbows are required.
- H. Conduit shall be bent according to manufacturer's recommendations.
- I. Use suitable conduit caps or other approved seals to protect installed conduit against entrance of dirt and moisture.

- J. Conduit stubs, sleeves, and nipples shall be terminated with a bushing. Provide a ground bushing as required by other specification sections.
- K. Provide 1/8 inch (3 mm) nylon pull string in empty conduit.
- L. Install expansion-deflection joints where conduit crosses building expansion joints. Expansion-deflection joints are not required where conduit crosses building control joints if the control joint does not act as an expansion joint. Install expansion fitting in PVC conduit runs as recommended by the manufacturer.
- M. Avoid moisture traps where possible. Where moisture traps are unavoidable, provide junction boxes with drain fittings at conduit low points.
- N. Where conduit passes between areas of differing temperatures such as into or out of cool rooms, freezers, unheated and heated spaces, buildings, etc., provide Listed conduit seals to prevent the passage of moisture and water vapor through the conduit.
- O. Route conduit through roof openings for piping and ductwork where possible.
- P. Conduit is not permitted in any slab or slab topping except passing perpendicularly through a slab or slab topping.
- Q. Ground and bond conduit under provisions of Section 16170.

#### 3.04 CONDUIT INSTALLATION SCHEDULE

- A. Conduit other than that specified below for specific applications shall not be used.
- B. Under slab on grade installations: Rigid steel conduit, Schedule 40 PVC conduit.
- C. Exposed outdoor locations: Rigid steel conduit.
- D. Concealed in concrete and block walls: Rigid steel conduit, electrical metallic tubing.
- E. Concealed dry interior locations: Rigid steel conduit, electrical metallic tubing.
- F. Exposed dry interior locations: Rigid steel conduit, electrical metallic tubing, flexible metal conduit (light fixtures and transformers).
- G. Motor and equipment connections: Flexible PVC coated metal conduit in all locations. Minimum length shall be one foot (300 mm), maximum length shall be three feet (900 mm). Conduit must be installed perpendicular to direction of equipment vibration to allow conduit to freely flex.

- H. Light fixtures: Direct box or conduit connection for surface mounted and recessed fixtures in inaccessible ceilings. Flexible metal conduit from a J-box for recessed light fixtures. Conduit size shall be 3/8" (10 mm) minimum diameter and six foot (1.8 M) maximum length. Flexible conduit length shall allow movement of fixture for maintenance purposes.

END OF SECTION

## SECTION 16123

### WIRE AND CABLE (Below 600 Volts)

#### PART 1 – GENERAL

##### 1.01 GENERAL

- A. Applicable provisions of the DOT Standard Specifications shall apply to this section.

##### 1.02 SCOPE

- A. Building wire and wiring connectors.

##### 1.03 SHOP DRAWING SUBMITTALS

- A. Submit under provisions of Section 16010.

##### 1.04 QUALIFICATIONS

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

##### 1.05 PROJECT CONDITIONS

- A. Verify that field measurements are as shown on Drawings.
- B. Conductor sizes are based on copper.
- C. Wire and cable routing shown on Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions.
- D. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required.

#### PART 2 – PRODUCTS

##### 2.01 GENERAL

- A. All wire shall be new, delivered to the site in unbroken cartons and shall be less than one year old out of manufacturer's stock.
- B. All conductors shall be copper.



- C. Insulation shall have a 600 volt rating.
- D. In mechanical rooms, light fixtures, and other high temperature applications, the insulation shall be rated 90 degrees C. Other areas shall use insulation rated 75 degrees C unless stated otherwise in other parts of these specifications and drawings.
- E. All conductors must be suitable for the application intended. Conductors #10 and larger must be stranded. Conductors #12 and smaller may be solid or stranded with the following requirements or exceptions:
  - 1. All conductors terminated with crimp type devices must be stranded.
  - 2. Stranded conductors may only be terminated with UL OR ETL Listed type terminations or methods: e.g. stranded conductors may not be wrapped around a terminal screw but must be terminated with a crimp type device.

## 2.02 BUILDING WIRE

- A. Description: Single conductor insulated wire.
- B. Insulation: Type THW, THHN/THWN, XHHW insulation for feeders and branch circuits.

## 2.03 WIRING CONNECTORS

- A. Split Bolt Connectors: Not acceptable.
- B. Solderless Pressure Connectors: High copper alloy terminal. May be used only for cable termination to equipment pads or terminals. Not approved for splicing.
- C. Spring Wire Connectors: Solderless spring type pressure connector with insulating covers for copper wire splices and taps. Use for conductor sizes 10 AWG and smaller.
- D. All wire connectors used in underground or exterior pull boxes shall be gel filled twist connectors or a connector designed for damp and wet locations.
- E. Mechanical Connectors: Bolted type tin-plated; high conductivity copper alloy; spacer between conductors; beveled cable entrances.
- F. Compression (crimp) Connectors: Long barrel; seamless, tin-plated electrolytic copper tubing; internally beveled barrel ends. Connector shall be clearly marked with the wire size and type and proper number and location of crimps.

## PART 3 – EXECUTION

### 3.01 GENERAL WIRING METHODS

- A. All wire and cable shall be installed in conduit.
- B. Do not use wire smaller than 12 AWG for power and lighting circuits.
- C. Splice only in junction or outlet boxes.
- D. No conductor less than 10 AWG shall be installed in exterior underground conduit.

### 3.02 WIRING INSTALLATION IN RACEWAYS

- A. Pull all conductors into a raceway at the same time. Use Listed wire pulling lubricant for pulling 4 AWG and larger wires and for other conditions when necessary.
- B. Install wire in raceway after interior of building has been physically protected from the weather and all mechanical work likely to injure conductors has been completed.
- C. Completely and thoroughly swab raceway system before installing conductors.
- D. Place all conductors of a given circuit (this includes phase wires, neutral (if any), and ground conductor) in the same raceway. If parallel phase and/or neutral wires are used, then place an equal number of phase and neutral conductors in same raceway or cable.

### 3.03 WIRING CONNECTIONS AND TERMINATIONS

- A. Splice only in accessible junction boxes.
- B. Wire splices and taps shall be made firm, and adequate to carry the full current rating of the respective wire without soldering and without perceptible temperature rise.
- C. All splices shall be so made that they have an electrical resistance not in excess of 2 feet (600 mm) of the conductor.
- D. Use solderless spring type pressure connectors with insulating covers for wire splices and taps, 10 AWG and smaller.
- E. Use mechanical or compression connectors for wire splices and taps, 8 AWG and larger. Tape uninsulated conductors and connectors with electrical tape to 150 percent of the insulation value of conductor.

- F. Thoroughly clean wires before installing lugs and connectors.
- G. At all splices and terminations, leave tails long enough to cut splice out and completely re-splice.

#### 3.04 WIRE AND CABLE INSTALLATION SCHEDULE

- A. All Locations: Building wire in raceways.

#### 3.05 WIRE COLOR

- A. Conductors of size 10 AWG and smaller – conductor insulation jacket shall be colored as indicated below. Conductors of size 8 AWG and larger - apply colored tape to conductors at all terminals, splices, and boxes, using color scheme indicated below:
  - 1. Use black and red for single phase circuits at 120/240 volts.
- B. Neutral Conductors: White for size 6 AWG and smaller. Size 4 AWG and larger, identify with white tape at both ends and at all access points, such as panelboards, motor starters, disconnects and junction boxes. Where there are two or more neutral conductors in one conduit, each shall be individually identified with the proper circuit.
- C. Branch Circuit Conductors: Three or four wire home runs shall have each phase uniquely color coded.
- D. Ground Conductors: Green for size 6 AWG and smaller. Size 4 AWG and larger, identify with green tape at both ends and at all access points, such as panelboards, motor starters, disconnects and junction boxes. See requirements of NEC 210-5 and 310-12. When isolated grounds are required, contractor shall provide green with yellow tracer.

#### 3.06 BRANCH CIRCUIT NEUTRAL CONDUCTORS

- A. The use of multi-wire branch circuits with a common neutral is not permitted. Each branch circuit shall be furnished and installed with an accompanying neutral conductor sized the same as the phase conductor.

END OF SECTION

## SECTION 16130

### BOXES

#### PART 1 – GENERAL

##### 1.01 GENERAL

- A. Applicable provisions of the DOT Standard Specifications shall apply to this section.

##### 1.02 SCOPE

- A. All wall and ceiling outlet boxes, pull and junction boxes for power, and lighting.
- B. All boxes shall be of sufficient size to provide free space for all conductors enclosed in the box and shall comply with Article 370 – NFPA 1999 (Article 314-NFPA 2002) and Table 370-16(a) – NFPA 1999 (Table 314-16(a)-NFPA 2002) of the National Electric Code.

##### 1.03 SUBMITTALS

- A. Submit product data under provisions of Section 16010.
- B. Provide product data showing configurations, finishes, dimensions, and manufacturer's instructions.

#### PART 2 – PRODUCTS

##### 2.01 OUTLET BOXES

- A. Sheet Metal Outlet Boxes: NEMA OS1 galvanized steel, with stamped knockouts.
- B. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 3/8 inch male fixture studs where required. Provide device ring of appropriate depth to accommodate the application. Refer to Part 3 Outlet Box Installation for required box sizes.
- C. Concrete Ceiling Boxes: Concrete type.
- D. Cast Boxes: Cast ferroalloy or aluminum, deep type, gasketed cover, threaded hubs.

## 2.02 PULL AND JUNCTION BOXES

- A. Pull boxes and junction boxes shall be minimum 4-inch square (100 mm) by 2-1/8th inches (54 mm) deep for use with 1 inch (25 mm) conduit and smaller. On conduit systems using 1-1/4 inch (31.75 mm) conduit or larger, pull and junction boxes shall be sized per NEC but not less than 4-11/16 inch square (117 mm).
- B. Sheet Metal Boxes: code gauge galvanized steel, screw covers, flanged and spot welded joints and corners.
- C. Box extensions and adjacent boxes within 48" of each other are not allowed for the purpose of creating more wire capacity.
- D. Junction boxes 6" x 6" or larger size shall be without stamped knock-outs.
- E. Wireways shall not be used in lieu of junction boxes.

## PART 3 – EXECUTION

### 3.01 COORDINATION OF BOX LOCATIONS

- A. Provide electrical boxes as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections, and code compliance.
- B. Electrical box locations shown on Contract Drawings are approximate unless dimensioned.
- C. No outlet shall be located where it will be obstructed by other equipment, piping, lockers, benches, counters, etc.
- D. Boxes shall not be fastened to the metal roof deck.
- E. It shall be the contractor's responsibility to study drawings pertaining to other trades, to discuss location of outlets with workmen installing other piping and equipment and to fit all electrical outlets to job conditions.
- F. In case of any question or argument over the location of an outlet, the contractor shall refer the matter to the architect/engineer and install outlet as instructed by the architect/engineer.
- G. The proper location of each outlet is considered a part of this contract and no additional compensation will be paid to the contractor for moving outlets which were improperly located.

- H. Locate and install boxes to allow access to them. Where installation is inaccessible, coordinate locations and provide 18 inch (450 mm) by 24 inch (600 mm) access doors.
- I. Locate and install to maintain headroom and to present a neat appearance.

### 3.02 OUTLET BOX INSTALLATION

- A. Do not install boxes back-to-back in walls. Provide minimum 6 inch (150 mm) separation, except provide minimum 24 inch (600 mm) separation in acoustic-rated walls.
  - 1. Conduit interconnecting boxes within a common wall shall utilize at least two Code complying 90-degree bends.
- B. Power: Recessed (1/4" maximum) outlet boxes in masonry, drywall, or tile construction shall be minimum 4 inch square with 4 inch square-cut device covers. Coordinate masonry cutting to achieve neat openings for boxes. Recessed outlet boxes in concrete shall be concrete type.
- C. Ceiling Boxes: Ceiling outlets shall be 4 inch (100 mm) octagon, minimum 2-1/8 inch (54 mm) deep, except that concrete boxes and plates will be approved where applicable. Position outlets to locate luminaires as shown on reflected ceiling plans. All ceiling outlets shall be equipped with 3/8 inch (10 mm) fixture studs.
- D. Provide knockout closures for unused openings.
- E. Support boxes independently of conduit except for cast boxes that are connected to two rigid metal conduits, both supported within 12 inches (300 mm) of box.
- F. Use multiple-gang boxes where more than one device are mounted together; do not use sectional boxes. Provide barriers to separate wiring of different voltage systems.
- G. Install boxes in walls without damaging wall insulation.
- H. Provide recessed outlet boxes in finished areas; secure boxes to interior wall and partition studs, accurately positioning to allow for surface finish thickness. Use stamped steel stud bridges for flush outlets in hollow stud wall, and adjustable steel channel fasteners for flush ceiling outlet boxes.
- I. Align wall-mounted outlet boxes for switches, thermostats, and similar devices.
- J. Surface wall outlets shall be 4 inch (100 mm) square with raised covers for one and two gang requirements. For three gang or larger requirements, use gang boxes with non-overlapping covers.

### 3.03 PULL AND JUNCTION BOX INSTALLATION

- A. Locate pull boxes and junction boxes above accessible ceilings, in unfinished areas or furnish and install approved access panels in non-accessible ceilings where boxes are installed.
- B. Support pull and junction boxes independent of conduit.

END OF SECTION

## SECTION 16141

### WIRING DEVICES

#### PART 1 – GENERAL

##### 1.01 GENERAL

- A. Applicable provisions of the DOT standard specifications shall apply to this section.

##### 1.02 SCOPE

- A. Wall switches, receptacles, occupancy sensors, device plates and box covers, and time clocks.
- B. All devices shall be delivered to the project in unbroken cartons.

##### 1.03 SUBMITTALS

- A. Submit product data under provisions of Section 16010.
- B. Provide product data showing configurations, finishes, dimensions, and manufacturer's instructions.
- C. Manufacturer's Instructions:
  - 1. Indicate application conditions and limitations of use stipulated by product testing agency specified under regulatory requirements.
  - 2. Include instructions for storage, handling, protection, examination, preparation, operation and installation of product.

#### PART 2 – PRODUCTS

##### 2.01 WALL SWITCHES

- A. Acceptable manufacturers (SPST models listed):
  - 1. Pass & Seymour      Model 20AC1
  - 2. Hubbell                Model HBL1221
  - 3. Leviton                Model 1221-2
- B. Provide 2 pole, 3-way, 4-way, pilot lighted, keyed, momentary, etc. models to match the manufacturer's series indicated above.



- C. Description: NEMA WD 1, Specification grade, AC only general-use snap switch.
- D. Body and Handle: Ivory, plastic with toggle handle.
- E. Ratings:
  - 1. Voltage: 120/277 volts, AC.
  - 2. Current: 20 amperes.

## 2.02 RECEPTACLES

- A. Duplex Convenience Receptacle: heavy duty, specification grade, one piece brass mounting strap, impact resistant nylon face:
  - 1. Pass & Seymour      Model 5362-A
  - 2. Hubbell                Model HBL5362
  - 3. Leviton                Model 5362-A
  - 4. Cooper                Model 5362
- B. GFCI Duplex Receptacle: Commercial grade convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements; 4-6 mA trip level, .025 second trip time, listed UL 498 and 943 (Class A), compliant with latest NEC, nylon face, trip indicator LED:
  - 1. Pass & Seymour      Model 2094
  - 2. Hubbell                Model GFR5352
  - 3. Leviton                Model 8899
  - 4. Cooper                Model XGF20
- C. Configuration: NEMA 5-20R.
- D. Device Body: Ivory, plastic.

## 2.03 DEVICE PLATES AND BOX COVERS

- A. Cover Plate: 302 lined stainless steel.
- B. Surface Cover Plate in Unfinished (Utility) Areas: Raised galvanized steel.
- C. Weather Protective Cover Plate: UV stabilized polycarbonate hinged gasketed device cover configured such that the weather protective rating is maintained when device is in use.
  - 1. Tay Mac                Model 20510 or as applicable.
  - 2. Intermatic            Model WP100

- D. Gaskets: Resilient neoprene, sized for device and device box.

## 2.04 TIME CLOCKS

- A. Manufacturers: Tork, Paragon, Leviton, or Intermatic
- B. Unit shall be a multi-purpose, 7-day, 365 day advance single and skip a day, combination 2 channel electronic time clock with a SPDT switching configuration and astronomic operation.
- C. The contacts shall be rated 10 amp resistive at 120/250 VAC, 7.5 amps inductive at 120/250 VAC, 5 amps inductive at 30 VDC and up to 1/2 hp at 250 VAC. The unit shall be rate for 30 VDC, 120 VAC, 250 VAC and 277 VAC.
- D. Capable of controlling both maintained and momentary contacts.
- E. The controller shall be capable of programming in the AM/PM or 24 hour format by jumper selection, in one-minute resolution, using 2 buttons only for all basic settings.
- F. Display shall be either LED type or LCD type.
- G. The unit shall have 365 day and or holiday selection capabilities, with 16 single date and 5 holiday selection options and user selectable daylight savings/standard time functions.
- H. The unit shall have 72-hour memory backup with rechargeable battery and charger.
- I. The unit shall be capable of manual override, On and Off to the next scheduled event, using 1 button for each channel.
- J. The enclosure shall be rated for indoor or outdoor installation.

## PART 3 – EXECUTION

### 3.01 INSTALLATION

- A. Install wall switches Off position down.
- B. Install vertically mounted convenience receptacles grounding pole on top, and horizontally mounted convenience receptacles with neutral contacts on top.
- C. Install wiring devices at heights shown on drawings.
- D. Install decorative plates on switch, receptacle, and blank outlets in finished areas, using jumbo size plates for outlets installed in masonry walls.

- E. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface-mounted outlets.
- F. Install devices and wall plates flush and level.
- G. Wiring devices shall have a bonding conductor from grounding terminal to both the equipment grounding conductor and the metal conduit system. Self-grounding wiring device using mounting screws as bonding means are not approved.
- H. Stranded conductors may only be terminated with UL or ETL Listed type terminations or methods: e.g. stranded conductors may not be wrapped around a terminal screw but must be terminated with a crimp type device.

### 3.02 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Operate each wall switch and sensor with circuit energized and verify proper operation.
- C. Verify that each receptacle device is energized.
- D. Test each receptacle device for proper polarity.
- E. Test each GFCI receptacle device for proper operation.

### 3.03 GROUND FAULT CIRCUIT INTERRUPTING RECEPTACLES

- A. Receptacles shown on plans with “GF” designation shall be a ground fault circuit interrupting type device. Daisy chain and series type installations are not acceptable.
- B. Ground fault circuit interrupting receptacles shall be wired to terminals labeled “line side” such that no single “GF” device will affect or open the circuit to another “GF” device or equipment on a common circuit. Do not connect to terminals labeled “load side”.
  - 1. “Line Side” terminals of “GF” device must be labeled as approved for more than one conductor termination, if not so labeled, then conductors will require to be spliced in device box.

### 3.04 OCCUPANCY SENSORS

- A. It shall be the contractor's responsibility to locate and aim sensors in the correct location required for complete and proper volumetric coverage within the range of coverage(s) of controlled areas per the manufacturer's recommendations. Rooms shall have coverage to completely cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the room(s). The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only the rooms which are to be provided with sensors. The contractor shall provide additional sensors if required to properly and completely cover the respective room. Occupancy sensors shall be adjusted for a time delay of 15 to 20 minutes to off.

END OF SECTION

## SECTION 16170

### GROUNDING AND BONDING

#### PART 1 – GENERAL

##### 1.02 GENERAL

- A. Applicable provisions of the DOT Standard Specifications shall apply to this section.

##### 1.03 SCOPE

- A. Grounding electrodes and conductors, equipment grounding conductors, and bonding.

#### PART 2 – PRODUCTS

##### 2.01 MECHANICAL CONNECTORS

- A. The mechanical connector bodies shall be manufactured from high strength, high conductivity cast copper alloy material. Bolts, nuts, washers and lockwashers shall be made of silicon bronze and supplied as a part of the connector body and shall be of the two bolt type.
- B. Split bolt connector types are not allowed.
- C. The connectors shall meet or exceed UL 467 and be clearly marked with the catalog number, conductor size and manufacturer.

##### 2.02 COMPRESSION CONNECTORS

- A. The compression connectors shall be manufactured from pure wrought copper. The conductivity of this material shall be no less than 99% by IACS standards.
- B. The connectors shall meet or exceed the performance requirements of IEEE 837, latest revision.
- C. The installation of the connectors shall be made with a compression tool and die system recommended by the manufacturer of the connectors. The die number shall be imprinted on the installed connector.
- D. The connectors shall be clearly marked with the manufacturer, catalog number, conductor size and the required compression tool settings.

- E. Each connector shall be factory filled with an oxide-inhibiting compound.
- F. Compression connector system shall be Burndy (Hyground series). Equal by Ilsco.

#### 2.03 EXOTHERMIC CONNECTIONS

- A. Coordination: Determine weld type and configuration. Provide proper mold.
- B. Description: Molecular weld.
- C. Catalyst: Powdered copper oxide
- D. Procedure: Follow manufacturer's recommendations.

#### 2.04 WIRE

- A. Material: Stranded copper (aluminum not permitted).
- B. Grounding Electrode Conductor: Size as shown on drawings, specifications or as required by NFPA 70, whichever is larger.
- C. Branch Circuit Equipment Ground: Size as shown on drawings, specifications or as required by NFPA 70, whichever is larger.

### PART 3 – EXECUTION

#### 3.01 GENERAL

- A. Install Products in accordance to manufacturer's instructions.
- B. Mechanical connections shall be accessible for inspection and checking. No insulation shall be installed over mechanical ground connections.
- C. Ground connection surfaces shall be cleaned and all connections shall be made so that it is impossible to move them.
- D. Attach grounds permanently before permanent building service is energized.
- E. Provide bonding to meet regulatory requirements.

#### 3.02 FIELD QUALITY CONTROL

- A. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

END OF SECTION

SECTION 16190  
SUPPORTING DEVICES

PART 1 – GENERAL

1.01 GENERAL

- A. Applicable provisions of the DOT standard specifications shall apply to this section.

1.02 SCOPE

- A. Conduit and equipment supports, straps, clamps, steel channel, etc, and fastening hardware for supporting electrical work.

1.03 QUALITY ASSURANCE

- A. Support systems shall be adequate for weight of equipment and conduit, including wiring, which they carry.

PART 2 – PRODUCTS

2.01 MATERIAL

- A. Support Channel: Galvanized steel, sized to support the load. Fittings and accessories shall be of the same manufacturer as the support channel.
- B. Expansion Anchors: All steel construction.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Fasten hanger rods, conduit clamps, and outlet and junction boxes to building structure using expansion anchors, beam clamps, and spring steel clips.
- B. File and de-bur cut ends of support channel and spray paint with cold galvanized paint to prevent rusting.
- C. Use toggle bolts or hollow wall fasteners in hollow masonry, plaster, or gypsum board partitions and walls; expansion anchors in solid masonry walls; self-drilling anchors or expansion anchor on concrete surfaces; sheet metal screws in sheet metal studs; and wood screws in wood construction.

- D. Do not fasten supports to piping, ductwork, mechanical equipment, cable tray or conduit.
- E. Do not use powder-actuated or plastic anchors.
- F. Do not drill structural steel members unless approved by A/E.
- G. Fabricate supports from galvanized structural steel or steel channel, rigidly welded or bolted to present a neat appearance. Use hexagon head bolts with spring lock washers under all nuts.
- H. Install surface-mounted cabinets and panelboards with minimum of four anchors. Provide steel channel supports to stand cabinet one inch (25 mm) off wall.
- I. Minimum sized threaded rod for supports shall be 3/8".
- J. Conduit clamps, straps, supports, etc., shall be steel or malleable iron. One-hole straps shall be heavy duty type. All straps shall have steel or malleable backing plates when conduit is installed on the interior or exterior surface of any exterior building wall.

END OF SECTION



## SECTION 16440

### DISCONNECT SWITCHES

#### PART 1 – GENERAL

##### 1.01 GENERAL

- A. Applicable provisions of the DOT standard specifications shall apply to this section.

##### 1.02 SCOPE

- A. Disconnect switches and enclosures.

##### 1.03 SUBMITTALS

- A. Submit product data under provisions of Section 16010.
- B. Include outline drawings with dimensions, and equipment ratings for voltage, capacity, horsepower, and short circuit.

#### PART 2 – PRODUCTS

##### 2.01 MANUFACTURERS

- A. Acceptable Manufacturers:
  - 1. Square D
  - 2. General Electric
  - 3. Cutler Hammer
  - 4. Siemens

##### 2.02 DISCONNECT SWITCHES

- A. Nonfusible Switch Assemblies: NEMA Type HD; quick-make, quick-break, load interrupter, enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position.
- B. Enclosures: NEMA type as indicated on drawings.

## PART 3 – EXECUTION

### 3.01 INSTALLATION

- A. Install disconnect switches where indicated on drawings and as required by code.
- B. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.

END OF SECTION

## SECTION 16470

### PANELBOARDS

#### PART 1 – GENERAL

##### 1.01 GENERAL

- A. Applicable provisions of the DOT standard specifications shall apply to this section.

##### 1.02 SCOPE

- A. Branch circuit panelboards.

##### 1.03 SUBMITTALS

- A. Submit shop drawings for equipment and component devices under provisions of Section 16010.
- B. Include outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.
- C. All of the panelboards provided under this section shall be by the same manufacturer.

##### 1.04 SPARE PARTS

- A. Keys: Furnish 2 each to owner.

#### PART 2 – PRODUCTS

##### 2.01 MANUFACTURERS

- A. Acceptable manufacturers:
  - 1. Square D
  - 2. General Electric
  - 3. Cutler Hammer
  - 4. Siemens

##### 2.02 BRANCH CIRCUIT PANELBOARDS

- A. Lighting and Appliance Branch Circuit Panelboards: Circuit breaker type.
- B. Enclosure: NEMA Type 1. Cabinet Size: 5-3/4 inches (144 mm) deep; 20 inches (508 mm) wide with 5" minimum gutter space top and bottom. Constructed of galvanized code gauge steel having welded corners. Panel enclosure (back box) shall be of non-stamped type (without KO's) to avoid concentric problem.

- C. Provide flush or surface cabinet front as scheduled on the drawings with concealed trim clamps, concealed hinge and flush cylinder lock all keyed alike. Front cover shall be hinged to allow access to wiring gutters without removal of panel trim. Hinged trim shall be held in place with screw fasteners. Finish in manufacturer's standard gray enamel.
- D. Provide metal directory holders with clear plastic covers.
- E. Provide panelboards with copper bus (phase buses, bus fingers, etc.), ratings as scheduled on drawings. Provide ground bars in all panelboards. Neutral and ground bars can be dual rated ALCU9. All spaces indicated shall have bus fully extended and drilled for the future installation of breakers.
- F. Minimum System (i.e. individual component) Short Circuit Rating: 10,000 amperes rms symmetrical for 240 volt panelboards.
- G. Molded Case Circuit Breakers: Bolt-on type thermal magnetic trip circuit breakers. Provide circuit breakers UL listed as Type SWD for lighting circuits. Provide UL Class A ground fault interrupter circuit breakers where scheduled on drawings. Provide UL shunt-trip accessory where scheduled on drawings.
- H. Do not use tandem circuit breakers.
- I. Circuit breakers shall be bolted type with common trip handle for all poles. No handle ties of any sort will be approved.

## PART 3 – EXECUTION

### 3.01 INSTALLATION

- A. Install panelboards plumb. Install recessed panelboards flush with wall finishes.
- B. Height: Install branch circuit panelboards 6 feet (2 m) to top. Install distribution panelboards with top circuit breaker not higher than 6'-7".
- C. Provide filler plates for unused spaces in panelboards.
- D. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.

### 3.02 FIELD QUALITY CONTROL

- A. Measure steady state load currents at each panelboard feeder. Should the difference at any panelboard between phases exceed 10 percent, rearrange circuits in the panelboard to balance the phase loads within 10 percent. Take care to maintain proper phasing for multi-wire branch circuits.
- B. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers, fusible switches, and fuses.

END OF SECTION

## SECTION 16510

### LIGHTING FIXTURES

#### PART 1 – GENERAL

##### 1.01 GENERAL

- A. Applicable provisions of the DOT standard specifications shall apply to this section.

##### 1.02 SCOPE

- A. Interior luminaires and accessories.

##### 1.03 SUBMITTALS

- A. Submit product data under provisions of Section 16010.
- B. Include outline drawings, support points, weights, accessory information and performance data for each luminaire type.

##### 1.04 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site and store and protect products under provisions of Section 16010.

#### PART 2 – PRODUCTS

##### 2.01 INTERIOR LUMINAIRES AND ACCESSORIES

- A. Interior Luminaires: As scheduled on drawings.

#### PART 3 – EXECUTION

##### 3.01 INSTALLATION

- A. Install in accordance to manufacturer's instructions.
- B. Install surface mounted luminaires plumb and adjust to align with building lines and with each other. Secure to prohibit movement.
- C. It shall be the contractor's responsibility to support all lighting fixtures adequately, providing extra steel work and framing for the support of fixtures as required. Any components necessary for mounting fixtures shall be provided by the contractor. No plastic, composition, or wood type anchors shall be used.
- D. Install wall mounted luminaires at height indicated on Drawings.

- E. Install accessories furnished with each luminaire.
- F. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- G. Bond fixtures and metal accessories to branch circuit equipment grounding conductor.
- H. Install specified lamps in each luminaire.

### 3.02 ADJUSTING AND CLEANING

- A. Align luminaires and clean lenses and diffusers at completion of Work. Clean paint splatters, dirt, and debris from installed luminaires.
- B. Touch-up luminaire finish at completion of work.

### 3.03 LUMINAIRE GROUNDING

- A. See Section 16170 - GROUNDING AND BONDING.

### 3.04 FIELD QUALITY CONTROL

- A. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

### 3.05 ALL FIXTURE CONNECTIONS

- A. Direct box or conduit connections for surface and recessed fixtures in inaccessible ceilings.
- B. Flexible metal conduit from a J-box for recessed lay-in light fixtures. Flexible metal conduit shall be minimum 3/8" (10 mm) minimum diameter and six foot (1.8 M) maximum length. Flexible conduit length shall allow movement of the fixture for maintenance purposes.
  - 1. The flexible connectors shall be all steel, galvanized, clamp type with locknut or snap-in connector.

END OF SECTION

## **25. Septic System, Item SPV.0105.06.**

### **A Description**

A septic system as described in the below specifications shall be installed and connected to the new restroom facility as shown on the plans.

### **B Materials**

See specifications below.

### **C Construction**

See specifications below.

### **D Measurement**

The department will measure Septic System as a lump sum unit of work, acceptably completed.

### **E Payment**

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.06	Septic System	LS

Payment is full compensation for furnishing all materials and equipment, and for supplying all labor, tools, equipment, and incidentals necessary to complete the work under the following bid item:

## **INDEX OF SEPTIC SEWER SPECIFICATIONS**

### **DIVISION 31- EARTHWORK**

Section 31 23 19 – Dewatering

Section 31 23 33 – Trenching and Backfilling

### **DIVISION 33- UTILITIES**

Section 33 34 00 – Sanitary Utility Sewerage Force Main

Section 33 36 13 – Utility Septic Tank, Effluent Wet Wells and Pumping System

Section 33 36 33 – Wastewater Dispersal Unit

## DIVISION 31 - EARTHWORK

### SECTION 31 23 19

#### DEWATERING

#### PART 1 GENERAL

##### 1.01 APPLICABLE PROVISIONS

- A. Applicable provisions of Section 101 through 109 shall govern the work of this section.

##### 1.02 APPLICABLE PUBLICATIONS

- A. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto.
  - 1. Wisconsin Administrative Code (WAC), Department of Natural Resources Environmental Protection Regulations, Current Edition.

##### 1.03 DESCRIPTION OF WORK

- A. The work under this section shall cover furnishing all materials and labor to keep all excavations free of water during the preparation of the subgrade, to keep all concrete and masonry work free of water through the time period specified herein, and to keep the excavation free of water during backfilling.

##### 1.04 RELATED WORK ELSEWHERE

- A. Trenching and Backfilling - Division 31
- B. Erosion Controls - Section 628
- C. Utility Septic Tank and Effluent Wet Wells and Pumping System - Division 33

##### 1.05 SUBMITTALS (NONE)

##### 1.06 OPERATION/MAINTENANCE MANUALS AND INSTRUCTIONS (NONE)

##### 1.07 PERMITS AND APPROVALS

- A. The contractor shall obtain a High Capacity Well Permit from the Wisconsin Department of Natural Resources for all wells installed or operated for pumping groundwater to lower the water table, for which the single or aggregate well capacity may be 70 gallons per minute (gpm) or greater. The contractor shall submit the High Capacity Dewatering Well Application (Form 3300-258) to the Wisconsin Department of Natural Resources, Private Water Supply Section, P.O Box 7921, Madison, WI 53707, along with any necessary permit fees, and



obtain said permit prior to the construction or operation of said high capacity well(s).

- B. The contractor shall be responsible for all equipment, labor, materials and supplies required to comply with the requirements of the High Capacity Well Permit, if necessary, at no additional cost to the owner.
- C. The contractor shall be responsible for all requirements of the General Discharge Permit for Pit and Trench Dewatering, if a permit is necessary, including monitoring, metering, sampling, testing, and reporting, and shall also be responsible for compliance with all discharge limits contained in the General Discharge Permit.
- D. The contractor shall be responsible for all equipment, labor, materials and supplies required to comply with the requirements of the General Discharge Permit for Pit and Trench Dewatering, at no additional cost to the owner.

## PART 2 PRODUCTS AND MATERIALS

### 2.01 GENERAL

- A. The contractor shall furnish dewatering sumps, wells, discharge pipe, and pumping equipment as may be required to adequately dewater the work.

### 2.02 PUMPING EQUIPMENT

- A. Pumping equipment shall be capable of running continuously except for conditions which may be approved by the engineer.

### 2.03 WELLS

- A. For the purposes of compliance, the provisions of chapter NR 812 apply to all new and existing drill holes to be utilized for the purpose of dewatering and the following:
  - 1. Wells governed under chapter NR 141 do not apply, unless they are high capacity wells, and shall not be used for the purpose of dewatering.

## PART 3 CONSTRUCTION METHODS

### 3.01 WATER LEVELS

- A. At all times during the excavation period and until its completion and acceptance at final inspection, ample means and equipment shall be provided with which to remove promptly, and dispose of properly, all water entering any excavation or other parts of the work. The excavation shall be kept dry and groundwater levels shall be kept low enough to prevent a quicksand condition from ruining the excavation bottom.

- B. Water levels shall be maintained at a level below all open excavations for precast structures until ballast is installed. Water levels will be allowed to rise on structures provided that water levels are raised uniformly on each side of walls.
- C. Water levels shall be maintained at a minimum level of 6 inches below the invert elevation of a pipe during placement.

### 3.02 WELLS

- A. For the purposes of construction and installation, and abandonment, the provisions of chapter NR 812 apply to all drillholes and wells.
- B. For the purpose of operation for wells used for dewatering, these operations shall be in accordance to the requirements of these specifications, the engineer and all local, municipal, and state codes, rules and regulations.

### 3.03 DISCHARGE LINE

- A. Discharge line shall be at a location approved by the engineer.

### 3.04 DISPOSAL OF WATER

- A. All water discharged from work sites shall be disposed of in such a manner to minimize erosion and sedimentation. Water must be discharged to a hard surface such as metal sheeting, wood sheeting, concrete, etc., so that erosion at the discharge point is eliminated.
- B. Temporary and permanent erosion and sedimentation control measures shall be performed by the contractor during construction to control water pollution, erosion and siltation, through the use of intercepting embankments, berms, dikes, dams, settling basins, sodding, planting and other erosion control devices or methods.
- C. No water containing settleable solids shall be discharged into storm sewers.

### 3.05 SAMPLING AND MONITORING

- A. Sampling and monitoring shall be performed by the contractor in accordance to WPDES permit requirements, if issued. The cover letter accompanying the permit shall specify which parameters shall be monitored to assure compliance with water quality standards or treatment technology based standards.
- B. Samples representative of the discharge shall be collected after treatment and prior to discharge to the environment. When treatment efficiency reporting is required, the influent sample shall be collected before the water passes through the treatment unit.

## PART 4 MEASUREMENT AND PAYMENT

### 4.01 GENERAL

- A. Dewatering shall be paid for at the bid price in accordance to one of the following methods, unless indicated otherwise in the Bid Schedule or Special Provisions.
- B. All work specified herein shall be considered in each of the measurement and payment method(s) stipulated, unless indicated otherwise in the Bid Schedule or Special Procedures - Division 01.

### 4.02 DEWATERING

- A. Dewatering, Lump Sum. When so provided, payment for dewatering shall be made at the contract lump sum price bid.
- B. Dewatering, Inclusive. When no quantity is provided, dewatering shall be considered inclusive to payment for work associated with the related utility or construction.

END OF SECTION

## SECTION 31 23 33

### TRENCHING AND BACKFILLING

#### PART 1 GENERAL

##### 1.01 APPLICABLE PROVISIONS

- A. Applicable provisions of Section 101 through 109 shall govern work of this section.

##### 1.02 APPLICABLE PUBLICATIONS

- A. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto.
  - 1. American Society for Testing and Materials (ASTM), Annual Book of ASTM Standards, Current Edition.
  - 2. Code of Federal Regulations (CFR), Title 29, Chapter XVII - Occupational Safety and Health Administration (OSHA), Department of Labor, Part 1926 Regulations, Current Edition.
  - 3. Wisconsin Administrative Code (WAC), Department of Natural Resources, Environmental Protection, Regulations, Current Edition.
  - 4. State of Wisconsin, Department of Transportation, Standard Specifications for Highway and Structure Construction, Current Edition at time of bid opening.

##### 1.03 DESCRIPTION OF WORK

- A. The work under this section shall include all excavating, trenching, and backfilling for utilities as indicated from the contract drawings and as specified herein.

##### 1.04 RELATED WORK ELSEWHERE

- A. Granular Backfill - Section 209
- B. Erosion Controls - Section 628
- C. Dewatering - Division 31
- D. Sanitary Utility Sewerage Forcemain - Division 33
- E. Utility Septic Tank and Effluent Wet Wells and Pumping System - Division 33

##### 1.05 SUBMITTALS (NONE)

##### 1.06 OPERATION/MAINTENANCE MANUALS AND INSTRUCTIONS (NONE)

## PART 2 PRODUCTS AND MATERIALS

### 2.01 INSITU BACKFILL MATERIAL

- A. Previously excavated soil free of organic debris, clay balls, and aggregate larger than 1-1/2 inches as approved by the engineer.

### 2.02 IMPORTED GRANULAR BACKFILL (TRUCKED BACKFILL) MATERIAL

- A. Imported granular fill (trucked backfill) shall be sand conforming to State of Wisconsin, Department of Transportation, standard spec 209.2.2, Grade No. 1 Granular Backfill or well-graded sand and gravel conforming to standard spec 305.2.2.1, 1-1/4 inch dense graded base with not more than 8 percent by weight passing a No. 200 sieve.

## PART 3 CONSTRUCTION METHODS

### 3.01 SURFACE OBSTRUCTIONS

- A. Structures, sidewalk, driveways, curb and gutter, trees, shrubs, lawns, signs, fences, utilities, survey monuments, pavements, culverts and other appurtenances which are adjacent to the right-of-way or work easements, shall be carefully protected against damage. In the event of damage or inadvertent injury or removal of these surface features by failure of the contractor to exercise reasonable precautions or proper construction techniques, he shall bear the full cost and responsibility for resulting damages and shall replace or repair such damage as early as possible. No allowance for extra payment or time lost will be allowed for such interferences that the contractor could have suspected or anticipated during pre-bid site inspection and interpretation of the bidding documents.
- B. Clearing, grubbing, and removal of all pavements, sidewalks, curbs, signs, poles, fences, etc., shall be done only as necessary for the completion of the work. Brush, trees, shrubs, concrete, rubble, and other removals, which are not intended to be replaced, shall be disposed of by the contractor off the work site.
- C. Obstructions, which are intended to be reset, shall be stored and protected by the contractor. Fences, signs, mailboxes, trees, shrubs, structures, and similar features requiring removal, shall be restored to their original position except where permanent removal is indicated.
- D. Monuments for land surveys encountered in the path of work shall be carefully protected from movement. Should removal be necessary, the contractor shall notify the engineer in advance. The contractor will be held responsible for re-establishing monuments lost due to his negligence or failure to notify the engineer at least 24 hours in advance of disturbing.

### 3.02 SUBSURFACE OBSTRUCTIONS

- A. The approximate location and size of sewers, drains, culverts, gas mains, water mains, survey monuments, electric and telephone conduits and other underground structures shown on the drawings are based on records available to the owner or surface markings indicating their existence.
- B. The contractor shall use caution in excavating and trenching so that the exact location of underground structures, both known and unknown, may be determined; he shall be held responsible for the repair of such structures when broken or otherwise damaged during construction.
- C. The contractor shall make arrangements with the utility companies for any relocation of interfering utilities. No extra cost due to unexpected delays or coordination work shall be incurred on the owner except for authorized utility alterations performed by the contractor as provided below.
- D. When the engineer permits the contractor to make a change to avoid a utility relocation, the engineer shall determine whether the change constitutes extra work as defined in the General Conditions.
- E. Any underground utilities or other structures, which the contractor wishes to have moved to facilitate construction, shall be arranged with the owner of such structures. The contractor shall pay all costs of the accommodation.
- F. In the event that there is any question as to whether any of the above enumerated obstructions, underground utilities or other structures cross or pass through the space occupied by the completed structures of this contract, the engineer's decision shall be binding upon the owner and the contractor.
- G. During the construction of the pipe lines, it may be necessary to cross under certain sewers, drains, culverts, water lines, gas lines, electric conduits and other underground structures. Where necessary, the flow in drains or culverts shall be diverted so that the excavation is kept dry during the progress of the construction work. Every effort shall be made to prevent damage to such underground structures. Wherever such structures are disturbed or broken, they shall be restored to good condition at no additional cost to the owner.
- H. The contractor shall use sand or gravel backfill beneath said structures. This backfill shall be deposited and thoroughly compacted by mechanical means in layers not to exceed 6 inches in depth.

### 3.03 EXCAVATION

- A. General. All excavation of every description and of whatever substances encountered shall be performed to the depths indicated or as otherwise specified.
1. During excavation, material suitable for backfilling shall be piled in an orderly manner a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. All excavated materials not required or suitable for backfill shall be removed and wasted as specified. Grading shall be done as may be necessary to prevent surface water from flowing into trenches or other excavations and any water accumulated therein shall be removed by pumping or by other approved methods.
  2. Sheet piling and shoring shall be placed as may be necessary for the protection of the work and for the safety of personnel. Unless otherwise indicated, excavation shall be by open cut.
- B. Trench Excavation. Trenches shall be of the necessary width for proper laying of pipe and shall conform to WAC requirements. The banks of pipe trenches shall conform to OSHA requirements and the contractor is responsible for all safety requirements of said codes.
1. Care shall be taken not to overexcavate. The bottom of the trenches shall be accurately graded to provide uniform bearing and support for each section of the pipe. Bell holes and depressions for joints shall be dug after the trench bottom has been graded, and in order that the pipe rest on the prepared bottom for as nearly its full length as practicable, bell holes and depressions shall be only of such length, depth, and width as required for properly making the particular type of joint. Stones shall be removed as necessary to avoid point bearing.
  2. Except as hereinafter specified for wet or other unstable material, overdepths shall be backfilled as and with materials specified for, backfilling the lower portion of trenches. Whenever wet or otherwise unstable material that is incapable of properly supporting the pipe is encountered in the bottom of the trench, such material shall be overexcavated to a depth to allow for construction of a stable pipe bedding. The trench shall be backfilled to the proper grade with suitable approved materials.
  3. Trench Width. The width of the trench at and below the top of the pipe shall be such that the clear space between the barrel of the pipe and the trench wall shall not be less than 6 inches nor exceed 12 inches on either side of the pipe, unless otherwise approved by the engineer in writing. The width of the trench above that level shall be as wide as necessary for sheet piling and bracing and the proper performance of the work.
  4. Excavation for Appurtenances. Excavation for manholes and similar structures shall be sufficient to leave at least 12 inches clear space between the outer surface of structure and the bank or timber that may be used to hold and protect the banks. Any overdepth excavation below such appurtenances that has not been directed will be considered unauthorized

and shall be refilled with sand, gravel, or concrete, as directed, at no additional cost to the owner.

5. Embedment. Embedment for utilities shall be as specified in the respective utility specification section.

- C. Protection and Removal of Utility Lines. The contractor shall notify all affected utility companies at least three consecutive working days preceding his construction operations to coordinate his work regarding poles, wires, valve boxes and other surface obstructions and to determine the location of gas, water main, power, light, telephone or telegraph conduit or service connection thereto or any other subsurface structure that crosses or passes through the space occupied by any of the proposed improvements. The contractor shall make advance arrangements with the utility companies for any relocation of interfering utilities so as not to delay construction.
- D. Interruptions of Services. Interruptions of utility services to existing buildings or facilities which become necessary either directly or indirectly due to work required under this contract shall be coordinated with the owner through the engineer. If the down time for connections is limited by them as to duration and time (weekend, nights or holidays), the contractor shall perform the work during the designated period at no additional cost to the owner.

### 3.04 BACKFILLING

- A. Types of Backfill. Backfill for sanitary sewers, water mains, storm sewers, culverts, and drainpipes is the material placed between the bedding and the ground surface. Debris, frozen material, organic matter, unstable material, or stones greater than 8 inches in diameter shall not be suitable for backfill. Large clods and stones not exceeding 8 inches in diameter, when allowed for use as backfill, shall not be placed within two feet of the top of the pipe. Backfill shall be of the following types:
  1. Type III Backfill:
    - a. Type III backfill shall be used in all areas where shown on the Plans or stated in Special Procedures - Division 01. Backfill material shall be suitable excavated material placed, from top of embedment to the bottom of surface restoration, in 12 to 18 inch layers and consolidated by jetting, spading, tamping, or puddling, to the approval of the engineer, to ensure complete filling of the trench.
- B. After Settlement. Should after settlement occur, succeeding any of the above backfilling methods, the contractor shall scarify the surface of the fill material and place additional fill material in the same manner as herein described so that the surface elevation conforms to that shown on the Plans. No additional compensation shall be allowed for repairing filled areas where after-settlement occurs.
- C. Backfill Placement. The excavated space around and above underground structures, tunnels, conduits and pipes not filled with embedment material and where select fill backfill is not shown or specified may be backfilled by machine.



- D. Backfilling work shall be done in such a way as to prevent dropping of material directly on top of any conduit or pipe through any great vertical distance. In no case shall backfilling material from a bucket be allowed to fall directly on a structure or pipe and in all cases, the bucket shall be lowered so that the shock of falling earth will not cause damage.
- E. Lumps shall be broken up and if there are any stones, pieces of crushed rock or lumps, which cannot be readily broken up, they shall be distributed throughout the mass so that all interstices are solidly filled with fine material. Stones, lumps and clods shall also be placed to maintain a 2 foot minimum separation distance from the top of the pipe or structure. No frozen material shall be used for backfilling.

#### PART 4 MEASUREMENT AND PAYMENT

##### 4.01 TRENCHING AND BACKFILLING

- A. Trenching and Backfilling, Inclusive. Trenching and backfilling shall be included in the payment for contract work related to the associated utility.

END OF SECTION

## DIVISION 33 - UTILITIES

### SECTION 33 34 00

#### SANITARY UTILITY SEWERAGE FORCEMAIN

##### PART 1 GENERAL

###### 1.01 APPLICABLE PROVISIONS

- A. Applicable provisions of Section 101 through 109 shall govern work of this section.

###### 1.02 APPLICABLE PUBLICATIONS

- A. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto.
  - a. American Society for Testing and Materials (ASTM), Annual Book of ASTM Standards:
  - b. ASTM D1598 - Standard Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure, Current Edition.
  - c. ASTM D1599 - Standard Test Method for Resistance to Short-Time Hydraulic Pressure of Plastic Pipe, Tubing, and Fittings, Current Edition.
  - d. ASTM D1784 - Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds, Current Edition.
  - e. ASTM D2239 - Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter, Current Edition.
  - f. ASTM D2241 - Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series), Current Edition.
  - g. ASTM D2321 - Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe, Current Edition.
  - h. ASTM D2447 - Specification for Polyethylene (PE) Plastic Pipe, Schedules 40 and 80 Based on Outside Diameter, Current Edition.
  - i. ASTM D2464 - Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80, Current Edition.
  - j. ASTM D2466 - Specification for Threaded Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40, Current Edition.
  - k. ASTM D2467 - Specification for Socket-Type Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80, Current Edition.
  - l. ASTM D2513-06a Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings, Current Edition.
  - m. ASTM D2683 - Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing, Current Edition.

- n. ASTM D2774 - Practice for Underground Installation of Thermoplastic Pressure Piping, Current Edition.
- o. ASTM D2855 - Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings, Current Edition.
- p. ASTM D3035 - Specification for Polyethylene Plastic Pipe Based on Controlled Outside Diameter, Current Edition.
- q. ASTM D3139 - Specification for Joints for Plastic Pressure Pipes Using Elastomeric Seals, Current Edition.
- r. ASTM D3261 - Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing, Current Edition.
- s. ASTM D3350 - Specification for Polyethylene Plastics Pipe and Fittings Materials, Current Edition.
- t. ASTM D3915 - Specification for Poly(Vinyl Chloride) (PVC) and Related Plastic Pipe and Fitting Compounds for Pressure Applications, Current Edition.
- u. ASTM D4020 - Specification for Ultra-High-Molecular-Weight Polyethylene Molding and Extrusion Materials, Current Edition.
- v. ASTM F1055 - Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene Pipe and Tubing, Current Edition.
- w. ASTM F1056 - Specification for Socket Fusion Tools for Use in Socket Fusing Joining Polyethylene Pipe and Tubing, Current Edition.
- x. ASTM F714 - Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter, Current Edition.
- 2. Commercial Standards (CS) U.S. Department of Commerce Standards, Current Edition.
- 3. Factory Mutual (FM), Specification and Standards, Current Edition.
- 4. Underwriters Laboratories, Inc. (UL), Specifications and Standards, Current Edition.

### 1.03 DESCRIPTION OF WORK

- A. The work under this section shall cover furnishing and installing all pipe and fittings for the force main and all gravity connector piping between structures and tanks as shown on the contract drawings, as specified, and as directed by the engineer.

### 1.04 RELATED WORK ELSEWHERE

- A. Granular Backfill – Section 209
- B. Topsoil and Salvaged Topsoil – Section 625
- C. Erosion Control – Section 628

- D. Seeding – Section 630
- E. Dewatering – Division 31
- F. Trenching and Backfilling – Division 31
- G. Utility Septic Tank and Effluent Wet Wells and Pumping System – Division 33
- H. Wastewater Dispersal Unit – Division 33

#### 1.05 SUBMITTALS

- A. Contractor shall submit such product literature and catalog cuts of materials to be supplied to relate these materials to the specifications.

#### 1.06 OPERATION/MAINTENANCE MANUALS AND INSTRUCTIONS (NONE)

### PART 2 PRODUCTS AND MATERIALS

#### 2.01 PIPE

All force main shall meet the following minimum requirements.

- A. Polyvinyl Chloride Pipe. Pipe shall be SCH 40 PVC, minimum Pressure Rating (PR) 200.

#### 2.02 FITTINGS

- A. All fittings for force main shall meet the following minimum requirements:
  - 1. Polyvinyl Chloride Pipe. Fittings shall compatible with the pipe used

#### 2.03 JOINTS

- A. All joints for pressure pipe shall meet the following minimum requirements:
  - 1. Polyvinyl Chloride Pipe. Joints shall conform with ASTM D2855 or ASTM D3139. Solvent weld or elastomeric seals will be acceptable.

#### 2.04 TRACER WIRE

- A. For direct burial installations, tracer wire shall be No. 12 gauge, ASTM C578, Type IV, solid insulated copper wire rated for wet conditions.
- B. Tracer wire for sanitary sewerage utilities installation shall have green colored insulator.

#### 2.05 INSULATION

- A. Insulation shall be extruded polystyrene insulation (25 psi) conforming to ASTM C578, Type IV, in 4 foot x 8 foot sheets with minimum thickness of 2 inches.

## PART 3 EXECUTION

### 3.01 GENERAL

- A. All construction shall be done in conformance with applicable sections of Wisconsin Administrative Code and the State Standard Specifications (SSS), for Sewer and Water Construction, except as modified herein.

### 3.02 EXCAVATION

- A. All excavation shall be done in conformance with Trenching and Backfilling Division 31 23 33, except as modified herein.

### 3.03 FIELD INSPECTION OF MATERIALS

- A. Before lowering and while suspended, the pipe or fittings shall be inspected for defects. All materials used in the work must pass field inspection.

### 3.04 INSTALLATION

- A. The contractor shall have sufficient and adequate equipment on the site of the work for unloading and lowering pipe and fittings into the trench.
- B. Extreme care shall be exercised by the contractor in handling all pipe, fittings and special castings so as to prevent breakage. Under no circumstances shall they be dropped into the trench or so handled as to receive hard blows or jolts when being moved.

### 3.05 JOINING OF PIPE

- A. Every precaution shall be taken to prevent foreign material from entering the pipe while it is being placed in the line. If the crew cannot put the pipe into the trench and in place without getting earth into it, the engineer may require that before lowering the pipe into the trench, a heavy, tightly woven canvas bag of suitable size shall be placed over each end and left there until the connection is to be made to the adjacent pipe.
- B. During laying operations, no debris, tools, clothing, or other materials shall be placed in the pipe.

### 3.06 CUTTING OF PIPE

- A. Pipe shall be cut at right angles to the centerline of the pipe. Cutting shall be done in a neat workmanlike manner without damage to the pipe and so as to leave a smooth end.
- B. All pipes shall be cut with an approved mechanical cutter. The cut end of a pipe to be used with rubber gasket joints shall be tapered by grinding or filing about

1/8 inch back at an angle of approximately 30 degrees with the centerline of the pipe, and any sharp or rough edges shall be removed.

C. OBSTRUCTIONS IN LINE OR GRADE

1. Whenever it becomes necessary to lay a main over, under or around a known obstruction, the contractor will furnish and install the required fittings. No additional compensation will be paid to the contractor for any expenses incurred because of such obstruction.
2. When an unknown underground structure interferes with the work to such an extent that an alteration of the plan is required, the contractor shall notify the engineer immediately.

3.07 JOINT DEFLECTION

- A. The maximum allowable deflection shall conform with ASTM D2774 for PVC pipe. If excess deflection is required, bends shall be furnished to provide angular deflections.
- B. The maximum deflection shall be as specified by manufacturer.

3.08 DEPTH

- A. The force main shall be placed at a depth as indicated on the contract drawings.
- B. Unless the forcemain is pitched to drain back to the dose tank, insulation shall be installed if bury is less than 7 feet (7'-0") or utility crossing effectively removes earthen freeze protection. Insulation shall be installed as shown on the contract drawings or as directed by the engineer in the field.

3.09 UNSTABLE SOIL

- A. If in the opinion of the engineer the trench bottom is of unstable material, he may direct the contractor to excavate the unstable material and replace same with 3/4 inch washed stone. Where the condition of unstable material is unusually severe, the engineer may order the placement of a concrete cradle. Materials used in such cases when not called for in the contract documents shall be paid for by change order at a negotiated price.

3.10 EMBEDMENT

- A. Class II embedment shall be used for all PVC pipe installed under this contract in accordance to the contract drawings and ASTM D2321.

3.11 TESTING

- A. All equipment required for hydrostatic testing shall be furnished and operated by the contractor subject to the approval of the engineer. This equipment shall include all sampling taps and necessary flushing appurtenances.

1. Hydrostatic tests shall consist of pressure and leakage test in accordance to AWWA C600, Section 4, Hydrostatic Testing. The hydraulic test shall be conducted at 150 percent of normal operating pressure or 50 psi, whichever is greater.
    - a. Water shall not be added during the pressure test. No pipe section will be accepted if the test pressure drops more than 5 psi within the two-hour test duration.
    - b. The leakage is the amount of water required to bring the pressure back up to the starting pressure once the pressure test passes.
  2. Hydrostatic tests shall be conducted on sections of main recommended as ready by the contractor and approved by the engineer. No section shall be less than 400 feet unless conditions warrant such testing of smaller sections.
- B. All tracer wire installed shall be tested for continuity. All tracer wire must pass the continuity test. Any sections not passing the continuity test must be excavated and replaced.

## PART 4 MEASUREMENT AND PAYMENT

### 4.01 GENERAL

- A. Force main shall be paid for at the bid price in accordance to one of the following methods, unless indicated otherwise in the Section 102 Bid Requirements and Conditions.
- B. All work specified herein shall be considered in each of the measurement and payment method(s) stipulated.

### 4.02 FORCE MAIN

- A. Force main, Linear Foot. Measurement for force main shall be per linear foot of specified diameter of pipe installed. Payment shall be made at the bid item price.
- B. Force main, Lump Sum. When so provided, payment shall be at the contract lump sum price bid. This payment shall include all work defined.
- C. Force main, Inclusive. When no quantity is provided, force main shall be inclusive to payment for work associated with the utility or infrastructure improvement.

END OF SECTION

## SECTION 33 36 13

### UTILITY SEPTIC TANK, EFFLUENT WET WELLS AND PUMPING SYSTEM

#### PART 1 GENERAL

##### 1.01 APPLICABLE PROVISIONS

- A. Applicable Provisions of Section 101 through 109 shall govern work of this section.

##### 1.02 APPLICABLE PUBLICATIONS

- A. Work under this section shall be done in accordance to all rules and regulations of any agency having jurisdiction, including but not limited to, Department of Safety and Professional Services (DSPS), County Sanitation Authorities, and ANSI National Electric Code.
- B. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto.

American Society for Testing and Materials (ASTM), Annual Book of ASTM Standards:

C33M-08	Standard Specifications for Concrete Aggregates
C143M-08	Standard Test Methods for Slump of Hydraulic Cement Concrete
C150-07	Standard Specifications for Portland Cement
C172-08	Standard Practice for Sampling Freshly Mixed Concrete
C231-08c	Standard Test Methods for Air Content of Freshly Mixed Concrete by the Pressure Method
C260-06	Standard Specifications for Air-Entraining Admixtures for Concrete
C494M-08a	Standard Specifications for Chemical Admixtures for Concrete
C618-08a	Standard Specifications for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete
C890-06	Standard Specification for Waste Water Structures
C1017M-07	Standard Specifications for Chemical Admixtures for Use in Producing Flowing Concrete
C1227	Standard Specifications for Precast Concrete Septic Tanks
A615	Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement, Current Edition.
D2146	Specification for Polypropylene Plastic Injections and Extrusion Materials, Current Edition.
F593	Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs, Current Edition.
ANSIAWWA D120	Thermosetting Fiberglass-Reinforced Plastic Tanks



American Society for Testing and Materials (ASTM), Annual Book of ASTM Standards:  
ASTM A48 - Specification for Gray Iron Castings, Current Edition.  
ASTM B43 - Specification for Seamless Red Brass Pipe, Standard Sizes, Current Edition.  
ASTM A312 – Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.  
ASTM A999 – Specification for General Requirements for Alloy and Stainless Steel Pipe.

National Electrical Manufacturers Associations (NEMA), Specifications and Standards, Current Edition.

Underwriters Laboratories, Inc. (UL), Specifications and Standards, Current Edition.

State of Wisconsin Plumbing Codes, SPS382 through 384.

Code of Federal Regulations (CFR), Title 29, Chapter XVII - Occupational Safety and Health Administration (OSHA), Department of Labor, Part 1926 Regulations, Current Edition.

State Department of Safety and Professional Services (DSPS), Administrative Code of Rules and Regulations, Current Edition.

State Department of Natural Resources (DNR), Administrative Code of Rules and Regulations, Current Edition.

State Standard Specifications (SSS), for Sewer and Water Construction, Current Edition.

#### 1.03 DESCRIPTION OF WORK

- A. Work in this section includes the furnishing and installation of: one 3000 gallon septic tank, one 2500 gallon septic tank, one 2 compartment 1800/1100 gallon combination septic and dose tank, and two effluent pumps with controls and operation control switches as shown on the contract drawings.
- B. Work under this section shall be done in accordance to all rules and regulations of any agency having jurisdiction, including but not limited to, the Department of Safety and Professional Services and Wisconsin Administrative Code.

#### 1.04 WORK LICENSE REQUIREMENTS

- A. Work under this section shall be performed under the direct supervision of a master plumber or master plumber restricted sewer holding a valid license issued by the State of Wisconsin. The plumber in charge is the master plumber or master plumber restricted whose signature appears on the sanitary permit. That person is responsible for notifying the county or DSPS Inspector when to inspect all parts of the system required to be inspected prior to burial of the item. The plumber shall

have present the proper apparatus and equipment for conducting the inspection and shall furnish such assistance as may be necessary in making proper inspection.

#### 1.05 PERMITS

- A. Contractor shall be furnished two complete sets (11" x 17") of state reviewed and approved plans by engineer.
- B. **Contractor shall obtain and pay for** the Sanitary Permit using standard form SBD-6398 provided by the Department of Safety and Professional Services. Deliver copies of these documents to the owner's Project Representative.
- C. The sanitary permit form SBD-6398 obtainable from the DSPS website <http://dsps.wi.gov/Default.aspx?Page=f1d5b3a3-d9b7-47ee-9b55-b62b054fb8e8> shall be filed along with the appropriate fees with the agency having jurisdiction over the project prior to the commencement of construction.

#### 1.06 RELATED WORK ELSEWHERE

- A. Topsoil and Salvaged Topsoil – Section 625
- B. Erosion Control – Section 628
- C. Seeding – Section 630
- D. Trenching and Backfilling - Division 31
- E. Dewatering – Division 31
- F. Sanitary Utility Sewerage Forcemain - Division 33
- G. Wastewater Dispersal Unit- Division 33

#### 1.07 SUBMITTALS

- A. Submit such product literature and catalog cuts of materials to be supplied to relate these materials to the specifications.

#### 1.08 OPERATION/MAINTENANCE MANUALS AND INSTRUCTIONS

- A. Submit the following data:
  - 1. Records of tests performed to certify compliance with the contract documents
  - 2. Certificates of inspection by regulatory agencies
  - 3. Manufacturer's installation, operation and maintenance recommendations for pumps, fixtures, equipment, valves and specialties.
  - 4. Additional information as indicated in the technical specification sections

#### 1.09 TRAINING OF OWNER PERSONNEL

- A. Instruct user agency personnel in the proper operation and maintenance of systems and equipment provided as part of this project. Demonstrate startup, operation and shutdown procedures for all equipment. All training to be during normal working hours.

#### 1.10 RECORD DRAWINGS

- A. Provide record drawings of any changes to the contract drawings.

#### 1.11 CONTINUITY OF EXISTING SERVICES

- A. Do not interrupt or change existing services without prior written approval from the owner's project representative. When interruption is required, coordinate scheduling of down-time with the owner to minimize disruption to facility activities.
- B. Contractor shall coordinate the timing of the connection of the new building sewer to the new septic tanks with the building contractor and the owner's project representative.

### PART 2 PRODUCTS AND MATERIALS

#### 2.01 SEPTIC TANKS AND COMBINATION SEPTIC/PUMP TANKS

- A. Tanks shall be fabricated of monolithic concrete construction. All tanks shall be watertight and fabricated so as to constitute an individual structure in accordance to the regulations set forth by the Department of Safety and Professional Services.
- B. Tanks shall be manufactured to meet requirements of ASTM C-1227 and applicable sections of Wisconsin Administrative Code.
- C. The tanks shall be state approved and installed in accordance to the rules and regulations set forth in by the Department of Safety and Professional Services.
- D. All concrete tanks shall be constructed using the admixture Xypex C-1000, or equal, incorporated into the concrete mix at rates specified by the manufacturer to provide corrosion resistant and waterproof concrete surfaces.
- E. Tanks shall be thoroughly coated on the outside surfaces with a waterproof material such as Wasser MC Tar, or equal, at the factory, prior to shipment to the site.
- F. All tank body joints shall be provided with two courses of bituminous gaskets for watertight seal.

## 2.02 BALLAST

- A. Each tank shall be provided with precast concrete ballast deadmen as shown on the contract drawings. The deadmen shall be securely attached to the tank with corrosion resistant straps and fasteners. Strapping, cables and anchoring system shall be as per manufacturer's recommendation for the size tank being installed.

## 2.03 ACCESS RISERS

- A. Tanks shall be equipped with access risers as shown on the contract drawings.
- B. Access risers shall have water tight seals at all section joints.
- C. Access risers terminating above grade shall be a minimum of 4 inches above finish grade and be equipped with a locking mechanism.
- D. Access riser minimum inside dimension shall be 23" or as indicated on the contract drawings.
- E. All access risers shall be constructed with a monolithic starter curb at the tank top. The starter curb section shall extend at least 3" minimum above the tank cover.

## 2.04 ACCESS COVERS

- A. All access covers greater than 8" in diameter shall be equipped with a permanent warning label indicating the dangers of entering the tank.
- B. The warning label shall be securely attached to the access cover and constructed of a non corrosive metal or plastic material bearing the legend "DO NOT ENTER WITHOUT PROPER EQUIPMENT" or "DANGEROUS GASES EXIST IN TANK" or similar language.
- C. Concrete covers shall be constructed with a shiplap joint to fit into the top riser section.
- D. Aluminum Hatch Covers.
  - 1. The access frames and covers shall be Halliday or approved equal, aluminum with stainless steel hinges, aluminum lifting handle and positive locking arm, and suitable to withstand a live load of 300 pounds/square foot loading. The door shall close flush with the top of the frame. The covers shall be cast into the top of the pump access lid. All aluminum in contact with concrete shall be bituminous coated to prevent corrosion.
  - 2. Doors shall be provided with stainless steel hinges with tamper-proof fasteners, an aluminum lifting handle, and stainless steel slam-lock with removable key handle and recessed pad lock post.
  - 3. Each door shall be equipped with compression spring opening and closing assist. Compression spring shall be set such that no more than 30 pounds of force is required to open the door.

4. Each door shall be provided with a flexible neoprene sealing gasket securely fastened to the frame.
5. Each double door shall be provided with “safety chains” fall protection where noted on contract drawings. The wet well frame shall be gasketed and shall have upper guardrail brackets and chain hooks.
6. Sizing of the access frames and covers shall be as per contract drawings and/or pump supplier’s recommendations.
7. Frames shall be manufactured with a minimum of 1/4 inch thick, one piece aluminum extruded frame, with a continuous concrete anchor as part of the one piece extrusion. All aluminum in contact with concrete shall be coated to prevent corrosion.
8. Frame shall have a mill finish.
9. Access hatch door units shall be guaranteed against defects in materials and workmanship for a period of 5 years.

#### 2.05 INSPECTION PORTS

- A. Tanks supplied with inspection ports over a baffle shall be a minimum size of 4 inches in diameter.
- B. Inspection port risers shall be constructed of SCH 40 PVC.
- C. Inspection ports shall extend to finished grade and terminate with an approved watertight plug.

#### 2.06 BAFFLES

- A. Tanks shall be equipped with baffles as shown on the contract drawings. Baffles shall be constructed of a non-corrosive material suitable for use in a sewage atmosphere and fastened to the tank walls with stainless steel or other non-corrosive materials.
- B. Baffles shall be installed such that inspection of this item can be conducted either through a service riser or an inspection port.

#### 2.07 WET WELL VENTS

- A. All wet wells shall be equipped with a vent as shown on the contract drawings. The minimum size of a wet well vent is 2 inches in diameter or as shown on the contract drawings.
- B. Vents shall be constructed of SCH 40 PVC.
- C. Vents shall terminate 18” above finished grade with a return bend fitting or an approved vent cap. If a return bend fitting is used, a stainless steel screen shall be inserted into the outlet.

## 2.08 EFFLUENT FILTERS

- A. Acceptable Manufacturer's include
  1. Bio-Microbics Sanitee Model ST 818
  2. Zabel A100, Model 12x28
  3. Or approved equal
- B. All effluent filters shall be approved for this use by the Wisconsin Department of Safety and Professional Services product approvals section.
- C. The maximum particle size allowed to pass through a filter and out of the septic tank is 1/8 inch diameter.
- D. Filters shall be rated for the design daily flow of the system being installed.
- E. Filters shall be secured and supported as necessary to prevent negative buoyancy effects to which they are subjected when the filter is loaded with biological material from the filtering process.
- F. Each filter shall be furnished with a removal tool specifically manufactured for the particular filter specified.

## 2.09 EFFLUENT PUMPS

- A. Effluent pumps shall be of the submersible centrifugal type made expressly for the pumping of sewage effluent. The effluent pumps shall be constructed of the following materials and shall conform to the following standards:
- B. Motor. Motor component of effluent pump shall be rated at 0.3 HP at 1750 RPM and shall operate with a 115 VAC, 60 Hertz, single phase electric power service supply. The motor shall have a maximum full load amperage rating of 11 amps. Motor type and model shall be compatible with the pump indicated on approved contract drawings.
- C. Pump. Pump construction shall consist of a cast iron pump body and impeller with a 416 stainless steel shaft. Pump type and model shall be as indicated on approved contract drawings.
- D. Hardware. All pump hardware shall be 300 series stainless steel.
- E. Pump Performance. Pump shall be capable of providing 15 gpm at a total design head (TDH) of 20 feet.
- F. Acceptable Manufacturer's.
  1. Goulds, Series WE Model WE0311L
  2. Or approved equal

- G. Miscellaneous. Each pump shall be equipped with the following:
1. Guide rail system: CentriPro Series A10-12 or equal.
    - a. 1 1/4 inch check valve
    - b. 1 1/4 inch gate valve w/extension handle
    - c. 1 1/4 inch diameter s.s. discharge pipe
    - d. 1/14 inch discharge coupling
    - e. 1" stainless steel guide rails
    - f. 3/16 inch s.s. cable. Length of cable shall be long enough to retrieve pump without entering tank space.

## 2.10 CONTROL PANEL

- A. A NEMA 3R enclosure with a fully gasketed door with padlockable door latches shall be used for the control box, which shall be mounted on a structure as shown in the contract drawings, within 10 feet of the dose tank.
- B. The control panel shall include for each pump:
1. A thermal magnetic circuit breaker. Breaker shall be sized in compliance with NEC requirements.
  2. A H-O-A (hand-off-auto) switch.
  3. A pump run light. Light shall be rated as 1/3 watt, 115 volt.
  4. A control circuit terminal block. Terminal block shall be provided for the connection of level controls.
  5. An elapsed time meter.
  6. A pump operation event counter.
- C. The control panel shall include for pump system:
1. Fuse block for control circuit. A one pole, 600 volt AC, 20 amp maximum rating type fuse shall be required.
  2. Automatic alternator. Alternator shall alternate operation of the pumps at the end of each pump shut-off cycle. Alternator circuitry shall also provide lag pump start-up in the event of lead pump capacity being less than inflow or if lead pump fails.
  3. The alarm for pump failure event shall be manual reset only.
  4. Control transformer. Control transformer shall be an open frame machine tool type and shall supply 115 volts to control circuit.
  5. High water alarm. A visual and audible alarm. The audible alarm shall be installed with a horn silencer switch.
  6. Lightning arrestor. Arrestor shall be connected to incoming power lines and panel ground.

## 2.11 PIPING

- A. Exterior
1. All forcemain piping and fittings outside the wetwell shall be SCH 40 PVC. Joints may be solvent weld, socket type or bell and spigot.

- B. Interior
  - 1. All forcemain piping on the interior portions of the wetwell shall be SCH 40 Stainless Steel meeting all requirements of ASTM A312. Fittings shall be Stainless steel or brass. Joints shall be threaded.

## 2.12 JUNCTION BOX

- A. A junction box attached to the pump tank riser shall be a watertight, corrosion proof box, with a NEMA 3R rating and installed with corrosion proof fasteners. All conduits entering the junction box shall be sealed.

## 2.13 FLOAT SWITCHES

- A. Only approved float switches shall be used in the tank to initiate the motor controls or alarm operations. The switches shall be compatible with the effluent pump control system.
- B. Float switches shall be suspended from 1 inch, Schedule 40 PVC pipe as shown in approved contract drawings. Switches shall be anchored with stainless steel clamps and hardware.
- C. The pump tank system shall have 3 float switches, - high water alarm, pump on, and pump off.

## PART 3 EXECUTION

### 3.01 EXCAVATION AND BACKFILL

- A. Install all tanks in accordance to manufacturer's instructions, the approved contract drawings and Wisconsin Administrative Code applicable regulations.
- B. Bedding material shall be granular in nature and shall pass a 1/2 inch screen. Required depth of bedding shall be as indicated on approved contract drawings.
- C. Backfill material may be native materials except that no rocks or stones greater than 3" in diameter may be placed within 12" of the tank sidewall.
- D. Contractor shall carefully compact the backfill material in equal lifts as specified by the tank manufacturer.
- E. Provide precast concrete ballast deadmen as shown on the contract drawings.



### 3.02 ELECTRICAL

- A. All electrical controls, enclosures, wiring and construction techniques shall be performed by the contractor in accordance to any and all rules, regulations, and codes of any agency having jurisdiction.

### 3.03 CONTROL SYSTEM

- A. Installation of pump control system shall be in accordance to manufacturers specifications or as approved by the engineer. The pump tank system float switch elevations are indicated on the approved contract drawings and installation will require each float positioned at the indicated respective elevations.

### 3.04 EQUIPMENT START-UP

- A. The equipment shall be started by a factory-trained representative who shall certify to the engineer that all equipment is installed and operating properly.

### 3.05 TESTING

#### A. Precast Tanks

1. All tanks shall be watertight and capable of withstanding the pressures to which they will be subjected.
2. All tanks shall be tested after installation by one of the following methods:
  - a. Vacuum Test
    - 1) Withstand a vacuum of:
      - a) At least 2 inches of mercury for 60 minutes without loss of pressure.
      - b) At least 4 inches of mercury for 5 minutes without loss of pressure.
  - b. Water Test
    - 1) Water shall be provided by the contractor.
    - 2) Hold water for one hour, without leakage after the tank has been filled with water to 6" above the highest joint in the riser and let stand for 24 hours. At the end of the initial 24 hours the tank may be refilled to the previous days water mark before the test is begun.
  - c. Contractor shall provide written documentation of all tests performed.

#### B. Pumping System

1. Water needed for the testing shall be provided by the contractor.
2. Each pump shall be tested after installation to check the in-field performance. The contractor shall furnish and install all gauges and accessories required for this test. Test procedure for each pump shall include running the pump a minimum duration of 5 minutes and recording

the pump flow rate. Perform this test a minimum of 3 times and average the flow rates to obtain the final result. The contractor shall provide a record of the individual pump flow rate for each pump for comparison with pump curves. The contractor shall also record amp readings for each pump to check for motor imbalance and excessive amp draw by the motor. The contractor shall be responsible for all adjustments or replacements necessary.

3. Any defects in the equipment or failure to meet the guarantees or requirements of the specifications shall be promptly corrected by the contractor by replacements or otherwise. The decision of the engineer as to whether or not the contractor has fulfilled his obligations under the contract shall be final. If the contractor fails or refuses to make these corrections or if the improved equipment, when tested shall again fail to meet the guarantees of the contractor, the owner, notwithstanding its ownership of work and materials which have entered into the manufacture of said equipment, shall have the option of rejecting said equipment or of accepting the same at such reduced price as may be agreed upon by the parties hereto.

#### 3.06 WARRANTY

- A. Provide manufacturer's standard warranty for all equipment.

### PART 4 MEASUREMENT AND PAYMENT

#### 4.01 GENERAL

- A. Payment shall be paid for at the bid price in accordance to the one of the conditions shown below.
- B. All work specified herein shall be considered in each of the measurement and payment method(s) stipulated.

#### 4.02 TANKS

- A. Tanks, Each. Measurement for Tanks shall be per specified tank installed. Payment shall be made at the bid item price.
- B. Tanks, Lump Sum. When so provided, payment shall be at the contract lump sum price bid. This payment shall include all work defined.
- C. Tanks, Inclusive. When no quantity is provided, tanks shall be inclusive to payment for work associated with the utility or infrastructure improvement.

#### 4.03 PUMPS and CONTROLS

- A. Pumps and Controls, Lump Sum. When so provided, payment shall be at the contract lump sum price bid. This payment shall include all work defined.
- B. Pumps and Controls, Inclusive. When no quantity is provided, pump shall be inclusive to payment for work associated with the utility or infrastructure improvement.

END OF SECTION

## SECTION 33 36 33

### WASTEWATER DISPERSAL UNIT

#### PART 1 GENERAL

##### 1.01 APPLICABLE PROVISIONS

- A. Applicable provisions of Section 101 through 109 shall govern the work of this section.

##### 1.02 APPLICABLE PUBLICATIONS

- A. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto.
  - 1. State of Wisconsin Administrative Code, Chapters SPS 381 to 387.
  - 2. State of Wisconsin, applicable POWTS Component Manual(s).
  - 3. American Society for Testing and Materials (ASTM), Annual Book of ASTM Standards, Current Edition.
  - 4. American Association of State Highway and Transportation Officials (AASHTO), Annual Book of AASHTO Standards, Current Addition.
  - 5. American National Standards Institute (ANSI), Standards, Current Edition.

##### 1.03 PERMITS

- A. State of Wisconsin, Department of Safety and Professional Services plan approval shall be obtained by the engineer and two (2) copies of the approved plans with the official red approval stamp and one (1) digital copy of the plan and specifications will be furnished to the contractor.
- B. **The contractor shall be responsible for obtaining and paying for** the sanitary permit, Department of Safety and Professional Services form SBD - 6398, from either the county where the dispersal unit is being installed or from the Department of Safety and Professional Services regional office if the system is serving a state owned facility.
- C. The fees for the sanitary permit and any recording fees shall be included in the bid price for the wastewater treatment system.

##### 1.04 DESCRIPTION OF WORK

- A. The work under this section shall consist of the construction of the dispersal unit complete, including cell excavation, grading, earthwork, furnishing and installing filter media of the type specified and to the depths and limits as shown on the contract drawings and specified herein. A complete installation includes dispersal cell construction, interconnection piping, the distribution piping network,

observation piping, distribution structure, supports and restoration of all disturbed areas.

#### 1.05 WORK RESTRICTIONS

- A. Work under this section must be performed under the direct supervision of a master plumber or master plumber restricted sewer holding a valid license issued by the State of Wisconsin. The person in charge is the master plumber or master plumber restricted whose signature appears on the county sanitary permit application.

#### 1.06 INSPECTIONS

- A. The person in charge is responsible for notifying the county or Department of Safety and Professional Services Inspector of needed inspections. The contractor shall have present the proper apparatus and equipment for conducting the inspection and shall furnish such assistance as may be necessary in making proper inspection.
- B. Inspections may be required at all of the following points:
  - 1. When the cell bottom is at final grade and ready for filter media.
  - 2. After the filter media is placed and the distribution lateral is installed.
  - 3. When the cell is completed and ready for backfill.

#### 1.07 RELATED WORK ELSEWHERE

- A. Topsoil and Salvaged Topsoil – Section 625
- B. Erosion Control – Section 628
- C. Seeding – Section 630
- D. Trenching and Backfilling – Division 31
- E. Sanitary Utility Sewerage Forcemain – Division 33
- F. Utility Septic Tank and Effluent Wet Wells and Pumping System – Division 33

#### 1.08 SUBMITTALS

- A. Contractor shall submit such product literature of materials to be supplied to relate these materials to the specifications.
  - 1. Geotextile Fabric
  - 2. Cell Filter Media
  - 3. Distribution Box Construction
  - 4. Manual Water Level Adjusters

## 1.09 OPERATION/MAINTENANCE MANUALS AND INSTRUCTIONS

- A. The manuals shall include operating and maintenance literature for the manual water level device. The submittal literature shall be in sufficient detail to allow for the installation, operation, adjustment, calibration, maintenance, and removal of each component provided.
- B. The contractor shall submit to the engineer for review, an outline of any variations of information for the operation and maintenance manuals and other documentation he proposes to prepare.

## PART 2 PRODUCTS AND MATERIALS

### 2.01 FILTER MEDIA

- A. Synthetic Media
  - 1. The synthetic aggregate shall be expanded polystyrene encased in polyethylene netting. The media shall be supplied in the bundle configuration shown on the contract drawings. The drain pipe incorporated into the media shall be 4" corrugated polyethylene pipe.
  - 2. The media bundles shall have a nominal diameter of 12" and come with an interlocking mechanism to connect sections together.
  - 3. The product must be listed in the Wisconsin Plumbing Products Register and be approved for use by the Safety and Buildings Division in wastewater dispersal applications.
  - 4. The synthetic media shall be Ezflow or approved equal of the appropriate length to fit the cell dimensions shown on the contract drawings.

### 2.02 PIPE, GENERAL

- A. All piping shall conform to the sizes shown on the contract drawings and shall be of the type and quality as scheduled, unless otherwise designated on the contract drawings.
- B. Polyvinyl Chloride (PVC). Pipe shall meet the requirements of ASTM D1785, for Schedule 40 PVC. Joint construction shall be threaded or solvent welded, as preferred by the contractor. Joints constructed of threaded couplings and fittings shall meet the requirements of ASTM D2464, ASTM D2466, and ASTM D3915 as they apply. Joints constructed of socket-type couplings and fittings and solvent welded shall meet the requirements of ASTM D2467, ASTM D2564, ASTM D2672, and ASTM D2855, as they apply.
- C. Polyethylene (PE). Pipe and joints shall meet the requirements of ASTM D2239. Pipe pressure class rating shall be Class 160, minimum. Solvent weld, butt fusion or elastomeric joints will be acceptable.

## 2.03 GEOTEXTILE FABRIC

- A. Geotextile fabric used in an on-site wastewater treatment system to prevent backfill material from entering the distribution cell shall meet the requirements listed in the currently published edition of SPS 384, Table 384.30-12:

## PART 3 CONSTRUCTION METHODS

### 3.01 DISPERSAL UNIT CONSTRUCTION

- A. Lines and Grades. The contractor is responsible for all layout work based on control points, significant topographic features and benchmarks shown on the contract drawings. The contractor shall establish the alignment, slopes, and grades for the work.
- B. Stripping. Strip all vegetation and topsoil from the areas where the dispersal cells will be constructed. Leave the cell separation space as undisturbed as possible. Stockpile sufficient topsoil as may be required for finishing. Dispose of unsuitable materials for backfill and topsoil by removing them from the site.
- C. Trenching and Excavation. Do not disturbed separation area between cells. Install all force mains and delivery piping within the designated areas of the dispersal unit as shown on the contract drawings. Install all wastewater delivery piping as per Section 33 34 00 Sanitary Utility Sewerage Forcemain and by one of the following methods:
  - 1. Place pipe below the frost line with minimum seven (7'- 0") of cover over the pipe.
  - 2. Slope the pipe back to the wet well and install a weep hole to drain the pipe into the wet well.
  - 3. Install insulation as shown on the contract drawings or as approved by the engineer.Bedding and backfill of delivery lines shall be as stated in Section 31 23 33 Trenching and Backfilling, DOT Section 209 and Section 33 34 00 Sanitary Utility Sewerage Forcemain.
- D. Cell Construction. Construction may not begin if the soil is too wet. The soil is too wet if the soil at the infiltrative surface can be rolled into a ¼ inch wire. Construction may not proceed if the soil at or below the infiltrative surface is frozen. Individual cell construction may begin at any point the contractor chooses. Fill from one cell may be used to backfill a previously completed cell so long as the previous cell has been inspected or remains accessible for final inspection at both ends of the cell. Contractor shall take great care to ensure that the cell bottom and sidewall soil is loose and not compacted. Any soils smeared in the process of cell construction shall be raked by hand to expose fresh soil surface, no compaction of the bottom and sidewall soils meant for infiltration of the wastewater is allowed.

Travel in the cell by any mechanical equipment is not allowed. Each cell shall be constructed with a level bottom in all directions.

- E. Grading Tolerances. The bottom of the filter shall be graded to within 0.10 feet of the grades indicated on the contract drawings prior to installation of the filter media.
- F. Media Installation. Install the media to the depth shown on the contract drawings. Layout the synthetic media bundles as shown in the contract drawings. Connect all sections as recommended by the product manufacturer. Install observation ports as shown on the contract drawings.
- G. Geotextile Fabric Installation. Immediately following the installation of the filter media and distribution network piping, a protective geotextile fabric, as specified herein, shall be installed directly on top of the filter media. When synthetic media is used the filter fabric shall be installed such that the edges at the filter media sidewalls reach down to a point 6" above the cell bottom.
- H. Finishing and Topsoiling. Finish grade all areas of the site which are disturbed. Provide slopes, swales and ditches as required to provide surface drainage and as shown on the contract drawings. Topsoil all disturbed areas as indicated on the contract drawings. Topsoil thickness shall be a minimum of 4 inches, and materials and methods shall conform with the requirements of Sections 625 and 630 of the State of Wisconsin, Department of Transportation, Standard Specifications for Highway and Structure Construction. Contractor shall provide supplemental topsoil as required to provide the thickness required if the salvaged topsoil is not sufficient.

## PART 4 MEASUREMENT AND PAYMENT

### 4.01 GENERAL

- A. Wastewater dispersal unit construction shall be paid for at the bid price in accordance to one of the following methods.
- B. All work specified herein shall be considered in each of the measurement and payment method(s) stipulated.

### 4.02 WASTEWATER DISPERSAL UNIT

- A. Wastewater Dispersal Unit Construction, Unit Price. When so provided, payment for wastewater dispersal unit, complete shall be made at the bid item price.
- B. Wastewater Dispersal Unit Construction, Inclusive. When no bid item or quantity is provided, wastewater dispersal unit construction shall be included in the payment for work associated with the utility or infrastructure improvement.

END OF SECTION



## **26. Miscellaneous Well Items, Item SPV.0105.06.**

### **A Description**

For the installation of the well and system, several items are required to install, connect it to the restroom building, and test it. These items are mostly covered under the department's standard specifications and if they are not all other items required to install the well system are described in this special provision and bid item.

### **B Materials**

See specification below.

### **C Construction**

See specification below.

### **D Measurement**

The department will measure Miscellaneous Well Items as a single lump sum unit of work, acceptably completed.

### **E Payment**

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.06	Miscellaneous Well Items	LS

Payment is full compensation for furnishing all materials and equipment, and for supplying all labor, tools, equipment, and incidentals necessary to complete the work.

## **INDEX OF MISCELLANEOUS WELL ITEMS SPECIFICATIONS**

### **DIVISION 44 – POLLUTION CONTROL EQUIPMENT**

#### **Section 44 42 56.21 – Submersible Well Pump (Small)**

DIVISION 44 - POLLUTION CONTROL EQUIPMENT  
SECTION 44 42 56.21

SUBMERSIBLE WELL PUMP AND PRESSURE TANK SYSTEM

PART 1 GENERAL

1.01 APPLICABLE PROVISIONS

- A. Applicable provisions of Section 101 through 109 shall govern the work of this section.

1.02 APPLICABLE PUBLICATIONS

- A. The following publications of the issues listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto.
  - 1. National Sanitation Foundation (NSF) Standard 56, "Pitless Well Adapters", Current Edition.
  - 2. Wisconsin Administrative Code, Chapter NR 812 - Well Construction and Pump Installation, Current Edition.
  - 3. Ten States Standards - Recommended Standards for Water Works, Current Edition.
  - 4. American Water Works Association (AWWA), Specifications and Standards:
    - a. AWWA C654 – Disinfection of Wells, Current Edition.

1.03 DESCRIPTION OF WORK

- A. The work under this section shall cover furnishing and installing a submersible well pump with all related appurtenances as specified herein. This work includes installation of the well pump, pitless unit, discharge piping up to and including the pressure tank(s) located in the building. Contractor shall furnish and install all electrical equipment and controls, connector piping, pressure gauge, sampling tap, check valves and flow control valves required for a fully functioning water supply system with an operating pressure of 50 to 70 psi.
- B. All work under this section shall be conducted in conformance with the Wisconsin Administrative Code Chapter NR 812 – Well Construction and Pump Installation, and in conformance with any applicable Wisconsin Department of Natural Resources (DNR) guidelines and regulations.

1.04 RELATED WORK ELSEWHERE

- A. Drilling Wells – Section 639

## 1.05 SUBMITTALS

- A. The contractor shall submit such Submittals and/or catalog cuts required for installation of the equipment. These drawings shall be accurate in every detail and shall contain all information necessary to relate the equipment to the specifications.
- B. The contractor shall provide a list of all instrumentation and control equipment components to be provided, catalog cuts, and descriptive information for each component.

## 1.06 OPERATION/MAINTENANCE MANUALS AND INSTRUCTIONS

- A. The manuals shall include operating and maintenance literature for all components provided. The submitted literature shall be in sufficient detail to allow for the installation, operation, adjustment, calibration, maintenance and removal of each component provided.
- B. Preparation of this document shall be in conformance with the requirements stated in Section 101 through 109 of these specifications.

## PART 2 PRODUCTS AND MATERIALS

### 2.01 GENERAL

- A. Manufacturer's name and catalog #s are listed as establishing the quality and performance desired only. Equipment manufactured by others are equally acceptable.

### 2.02 PUMP

- A. General Design. The pump and motor for each well shall be a submersible well pump and motor suitable for installation in a 6 inch diameter well. The pump and motor shall be suitably sized for the design conditions.
- B. Operating Criteria. Pump shall be designed to meet flow and head conditions based on parameters as follows:

Capacity at full load: 15 gpm

Total pumping head (min.): 180 ft.

Total pumping head (max.): 200 ft.

Static water depth when not pumping: 10± ft. below ground surface (estimated)

Depth below surface when pumping: 100 ft. (estimated)

Maximum synchronous speed: 3600 rpm

Minimum motor horsepower:	1.0 hp (estimated)
Length and diameter of column pipe:	100 ft. (1.5 inch)
Diameter of well:	6 inch
Depth of well:	175 ft. (estimated)
Pressure operating range	50/70 psi

- C. The contractor shall determine the exact pump drop pipe length based on pump setting, pump and motor assembly, and discharge head assembly.
- D. The well pump criteria (capacity and TDH requirements) are to be based on the actual field conditions as determined from test pumping the well.
- E. Acceptable pump manufacturer's;
  - 1. Goulds Model 18GS10
  - 2. Or approved equal

## 2.03 PUMP CHARACTERISTICS

- A. The approved submersible well pump shall have the following characteristics:
  - 1. Pump Bowls: The pump bowls shall either be a stainless steel or a close grain, high grade, cast or ductile iron.
  - 2. Impellers: The pump impellers shall be bronze or an approved material. Impellers shall be firmly secured to the pump shaft by a tapered sleeve and locknut assembly.
  - 3. Pump Shaft: The pump shaft shall be stainless steel with a chrome content of not less than 127. No impeller shaft keyway shall be permitted in the pump shaft.
  - 4. Suction Strainer: The pump assembly shall include a stainless steel or bronze strainer covering the entrance to the suction chamber. The strainer shall be slotted or otherwise perforated at the manufacturer's option to contain not less than the 2.5 times the area of the suction nozzle of the pumps. The strainer slots shall be sized to exclude all materials which the impeller shall not pass.
  - 5. Bowl Bearings: The bowl bearing shall be water lubricated and manufactured of high quality bronze or stainless steel.

## 2.04 MOTOR CHARACTERISTICS

- A. The pump motor shall be of the totally enclosed type suitable for continuous duty in underwater operation. The motor shall possess the following characteristics:
  - 1. Motor shall operate upon a 230 volt, 2 wire, 1 phase, 60 Hz, AC electric service;
  - 2. Motor shall be constructed of predominantly non-corrosive materials;
  - 3. Motor shall be capable of running in either direction without damage;
  - 4. Motor thrust bearings shall have a rating in excess of maximum load possible caused by the pump operating at the rated conditions or at any capacity on the design curve;
  - 5. A flow inducer sleeve shall be provided to promote circulation of intake water to cool the motor. Sleeve shall be fully compatible with the approved submersible pump, be of corrosion resistant heavy plastic material and induce a minimum 0.5 fps velocity circulation rate past the pump motor.
- B. The motor shall be inverter duty rated for use with a variable frequency drive.

## 2.05 POWER CABLE

- A. The pump shall be provided with a sufficient length of power cable to extend from the motor control center to the motor termination connection cable. The cable shall comply with the National Electric Code and shall have two conductors of not less than seven strands each. The cable shall be enclosed in a watertight synthetic inner jacket and an outer protective covering completely impervious to oil.
- B. The cable shall be clamped to the column pipe by suitable stainless steel clamps at intervals not exceeding 10 feet. These clamps shall incorporate a rubber gasket to prevent the cable being damaged.
- C. Provide an electric grounding system at the well head as required by the National Electric Code.

## 2.06 PUMP CONTROLS

- A. A pump controller, compatible with the pump motor, shall be provided complete for the well.
- B. The system operating conditions shall meet the requirements stated in 2.02(B)

## 2.07 PRESSURE TANK

- A. Two tanks are required.
- B. Anticipated operating pressure range of 50 to 70 psi.
- C. Gross volume required - 86-gallons (single tank) 172 gallons (dual tanks).

- D. Drawdown volume required 20 gallons (single tank) 40 gallons (dual tanks).
- E. Acceptable manufacturer's:
  - 1. Well-X-Trol Model WX 302.
  - 2. Or approved equal

#### 2.08 PRESSURE TANK PIPING MANIFOLD

- A. Provide a manifold piping network to connect both pressure tanks to the well discharge pipe.
- B. Provide a shut off ball valve for each tank connection pipe.
- C. Piping shall be copper or galvanized iron.
- D. Fittings shall match pipe used.
- E. Provide a sample tap.
- F. Provide a pressure switch and gauge.

#### 2.09 PUMP COLUMN PIPING

- A. The pump column shall be standard Schedule 80 PVC pipe, 1 1/2 inches in diameter, in 20-foot lengths, constructed with appropriate couplings. Provide torque arrestors on piping as recommended by the pump manufacturer. Provide a minimum thread resistance of 10-foot pounds per horsepower.

#### 2.10 CHECK VALVE

- A. One fully automatic in-line silent check valve shall be installed in the drop pipe, within at the first joint of pipe above the pump. Check valve shall be the same size as the drop pipe.
- B. Check valve shall have bronze or brass body, stainless steel spring, guide bushing, and Nitrile seal. Valve body shall be drilled/tapped and provided with a stainless steel break-off plug for drainage of the line when the pump is removed.

#### 2.11 DISCHARGE PIPING

- A. Discharge piping to the control building shall be 1.5-inch copper, HDPE or approved equal. Contractor shall provide all necessary fittings to connect the well to the pressure tank in the building.
- B. Contractor shall coordinate piping installation with the building plumbing contractor.

## 2.12 APPURTENANCES IN BUILDING

- A. Contractor to supply and install drain valve, pressure switch, pressure gauge, flow control valves, check valve and sample tap, manifold piping and all associated piping to connect to the pressure tank(s). Contractor shall stub out a minimum of 2.0' of distribution pipe beyond the pressure tanks for interior plumbing pipe connection.

## 2.13 WELL SEAL

- A. Provide a one-piece well seal meeting the requirements of NR 812 for an outdoor, low capacity installation. The well seal shall contain a sufficient number of watertight openings for the appurtenances specified herein. The seal shall not be subjected to the weight of the pump load.

## 2.14 WELL VENT

- A. A screened well vent shall be provided which terminates in a screened "U"-bend at least 24 inches above the finish grade or shall be provided as the standard component of an approved factory assembled pitless unit. Screen material shall be noncorrosive.

## 2.15 PITLESS UNIT

- A. The pitless unit shall be approved by the Wisconsin Department of Natural Resources (WDNR) and meet the requirements of NR 812.31.
- B. The pitless unit shall have the following characteristics:
  - 1. Maximum Discharge Pressure Rating: 90 psi
  - 2. Discharge Pipe I.D.: 1.5 inch
  - 3. Column Pipe.: 1.5 inch
- C. The pitless unit shall be a weld-on type as manufactured by
  - 1. Maass Midwest Manufacturing, Inc.
  - 2. Hole Products
  - 3. Or approved equal

## PART 3 CONSTRUCTION METHODS

### 3.01 INSTALLATION

- A. Install the pump in accordance to the manufacturer's recommendations and approved submittals.
- B. Termination of power cable and discharge piping shall be as approved by engineer.

### 3.02 TESTING

- A. The pump shall be tested after installation to check guaranteed performance. Any defects shall be promptly corrected.
- B. Bacteriological Test. The contractor shall be responsible for sampling the raw water from the well after pump installation. Samples after construction of the well were “safe”. All costs for bacteriological testing shall be included in the lump sum bid for the Work. **Two** “safe” water tests with respect to coliform bacteria shall be obtained and the laboratory reports shall be submitted to the owner and engineer.

### 3.03 EQUIPMENT START-UP

- A. The equipment shall be started by a factory-trained representative who shall certify to the owner that all equipment is properly installed and that the operator has been instructed in operation and maintenance.

## PART 4 MEASUREMENT AND PAYMENT

### 4.01 GENERAL

- A. Submersible Well Pump and Pressure Tank System shall be paid for at the bid price in accordance to one of the following methods, unless indicated otherwise in the Section 102 Bid Requirements and Conditions.
- B. All work specified herein shall be considered in each of the measurement and payment method(s) stipulated.

### 4.02 SUBMERSIBLE WELL PUMP

- A. Submersible Well Pump, Each. When so provided, payment shall be at the price per bid item. This payment shall include all work defined.
- B. Submersible Well Pump, Inclusive. When no bid item or quantity is provided, submersible well pump shall be included in the payment for work associated with the utility or infrastructure improvement.

### 4.03 PRESSURE TANK SYSTEM

- A. Pressure Tank System, Each. When so provided, payment shall be at the price per bid item. This payment shall include all work defined.
- B. Pressure Tank System, Inclusive. When no bid item or quantity is provided, Pressure Tank System shall be included in the payment for work associated with the utility or infrastructure improvement.

END OF SECTION



## **27. Salvage and Reinstall Existing Kiosk, Item SPV.0105.07.**

### **A Description**

There is an existing information kiosk located on the site as indicated on the plans. This existing structure shall be salvaged and relocated to the location designated on the plans.

### **B Materials**

No additional materials are anticipated to be installed on the kiosk, unless during the removal of the structure the footing boards are unable to be removed, then the contractor will need to replace the 4x4 treated, painted brown wooden posts. Any additional damage caused to the kiosk structure, the contractor shall be responsible for replacing these items at their own cost.

### **C Construction**

The contractor shall dig around the footings of the existing structure to expose the 4x4 post footings. Carefully pick up and reset the structure in the new location. If new footing posts are required, replace these posts and any other items that are damaged during the remove and reinstallation.

### **D Measurement**

The department will measure Salvage and Reinstall Existing Kiosk as a lump sum unit of work, acceptably completed.

### **E Payment**

The department will pay for measured quantity at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.07	Salvage and Reinstall Existing Kiosk	LS

Payment is full compensation for excavating, salvaging, and reinstalling the kiosk. It shall include all labor, any additional materials to be replaced, and the installation equipment necessary to complete the work.

## **28. Construction Staking Site Layout, Item SPV.0105.08.**

### **A Description**

Construction staking of the site layout shall include the staking of the restroom building, signs, septic tanks, well, septic field, fence, and any other associated items that are not included in the other standard staking items.

### **B Materials**

Typical survey materials such as lathe, marking tape, spray paint, etc. shall be used to mark and layout the overall site.

**C Construction**

Set and maintain construction stakes or marks as necessary to achieve the required accuracy and to support the method of operations. Locate all items to within 0.01 feet vertically and 0.02 feet horizontally. Determine that all the final elevations match existing field elevations, and provide this information to the engineer at a mutually agreed upon date or at least 14 calendar days before ordering materials.

**D Measurement**

The department will measure Construction Staking Site Layout as a lump sum unit of work for construction staking site layout, acceptably completed.

**E Payment**

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0105.08	Construction Staking Site Layout	LS

Payment is full compensation for all labor, materials, and the installation/staking of the proposed site items necessary to complete the work.

Construction Staking Site Layout shall be paid as a lump sum contract price which shall be paid in full once all site layout construction staking is completed.



## **ADDITIONAL SPECIAL PROVISION 4**

### **Payment to First-Tier Subcontractors**

Within 10 calendar days of receiving a progress payment for work completed by a subcontractor, pay the subcontractor for that work. The prime contractor may withhold payment to a subcontractor if, within 10 calendar days of receipt of that progress payment, the prime contractor provides written notification to the subcontractor and the department documenting "just cause" for withholding payment.

The prime contractor may also withhold routine retainage from payments due subcontractors.

### **Payment to Lower-Tier Subcontractors**

Ensure that subcontracting agreements at all tiers provide prompt payment rights to lower-tier subcontractors that parallel those granted first-tier subcontractors in this provision.

### **Release of Routine Retainage**

After granting substantial completion the department may reduce the routine retainage withheld from the prime contractor to 75 percent of the original total amount retained.

When the Department sends the semi-final estimate the department may reduce the routine retainage withheld from the prime contractor to 10 percent of the original total amount retained.

Within 30 calendar days of receiving the semi-final estimate from the department, submit written certification that subcontractors at all tiers are paid in full for acceptably completed work and that no routine retainage is being withheld. The department will pay the prime contractor in full and reduce the routine retainage withheld from the prime contractor to zero when the department approves the final estimate.

This special provision does not limit the right of the department, prime contractor, or subcontractors at any tier to withhold payment for work not acceptably completed or work subject to an unresolved contract dispute.

**ADDITIONAL SPECIAL PROVISION 6****ASP 6 - Modifications to the standard specifications**

*Make the following revisions to the standard specifications:*

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**450.3.2.1 General**

*Replace the entire text with the following effective with the January 2015 letting:*

- (1) Do not place asphaltic mixture when the air temperature approximately 3 feet above grade, in shade, and away from artificial heat sources is less than 36 F for upper layers or 32 F for lower layers unless the engineer allows in writing. The contractor should place HMA pavement for projects on or north of STH 29 between May 1 and October 15 inclusive and for projects south of STH 29 between April 15 and November 1 inclusive. Notify the engineer at least one business day before paving.
  - (2) Unless the contract specifies otherwise, conform to the following:
    - Keep the road open to all traffic during construction.
    - Prepare the existing foundation for treatment as specified in 211.
    - Incorporate loose roadbed aggregate as a part of preparing the foundation, in shoulder construction, or dispose of as the engineer approves.
  - (3) Place asphaltic mixture only on a prepared, firm, and compacted base, foundation layer, or existing pavement substantially surface-dry and free of loose and foreign material. Do not place over frozen subgrade or base, or where the roadbed is unstable.
- 

**450.5 Payment**

*Replace the entire text with the following effective with the May 2015 letting:*

- (1) All costs of furnishing, maintaining, and operating the truck scale or other weighing equipment and furnishing the weigh tickets are incidental to the contract.
  - (2) Nonconforming material allowed to remain in place is subject to price adjustment under 105.3.2.
  - (3) Full-depth sawing to remove integrally placed safety edge where not required is incidental to the contract.
  - (4) The contractor is responsible for the quality of HMA pavement placed in cold weather. If because of an excusable compensable delay under 108.10.3, the engineer directs the contractor to pave when the temperature is less than 36 F for the upper layer or less than 32 F for lower layers, the department:
    - Will relieve the contractor of responsibility for damage and defects the engineer attributes to cold weather paving.
    - Will not assess disincentives for density or ride.
- 

**455.3.2.1 General**

*Replace the paragraphs one and two with the following effective with the January 2015 letting:*

- (1) Apply tack coat only when the air temperature is 32 F or more unless the engineer approves otherwise in writing. Before applying tack coat ensure that the surface is dry and reasonably free of loose dirt, dust, or other foreign matter. Do not apply if weather or surface conditions are unfavorable or before impending rains.
- (2) Use tack material of the type and grade the contract specifies. The contractor may, with the engineer's approval, dilute tack material as allowed under 455.2.4. Provide calculations using the asphalt content as-received from the supplier and subsequent contractor dilutions to show that as-placed material has 50 percent or more residual asphalt content. Apply at 0.050 to 0.070 gallons per square yard, after dilution, unless the contract designates otherwise. The engineer may adjust the application rate based on surface conditions. Limit application each day to the area the contractor expects to pave during that day.

**460.2.2.3 Aggregate Gradation Master Range**

*Replace paragraph one with the following effective with the December 2014 letting:*

- (1) Ensure that the aggregate blend, including recycled material and mineral filler, conforms to the gradation requirements in table 460-1. The values listed are design limits; production values may exceed those limits.

**TABLE 460-1 AGGREGATE GRADATION MASTER RANGE AND VMA REQUIREMENTS**

SIEVE	PERCENTS PASSING DESIGNATED SIEVES						
	NOMINAL SIZE						
	37.5 mm	25.0 mm	19.0 mm	12.5 mm	9.5 mm	SMA 12.5 mm	SMA 9.5 mm
50.0-mm	100						
37.5-mm	90 – 100	100					
25.0-mm	90 max	90 - 100	100				
19.0-mm	—	90 max	90 - 100	100		100	
12.5-mm	—	—	90 max	90 - 100	100	90 - 97	100
9.5-mm	—	—	—	90 max	90 - 100	58 - 72	90 - 100
4.75-mm	—	—	—	—	90 max	25 - 35	35 - 45
2.36-mm	15 – 41	19 - 45	23 - 49	28 - 58	20 - 65	15 - 25	18 - 28
75-µm	0 – 6.0	1.0 - 7.0	2.0 - 8.0	2.0 - 10.0	2.0 - 10.0	8.0 - 12.0	10.0 - 14.0
% MINIMUM VMA	11.0	12.0	13.0	14.0 <sup>[1]</sup>	15.0 <sup>[2]</sup>	16.0	17.0

<sup>[1]</sup> 14.5 for E-0.3 and E-3 mixes.

<sup>[2]</sup> 15.5 for E-0.3 and E-3 mixes.

**460.3.4 Cold Weather Paving**

*Add a new subsection as follows effective with the May 2015 letting:*

**460.3.4 Cold Weather Paving****460.3.4.1 Cold Weather Paving Plan**

- (1) Submit a written cold weather paving plan to the engineer at the preconstruction meeting. In that plan outline material, operational, and equipment changes for paving when the air temperature approximately 3 feet above grade, in shade, and away from artificial heat sources is less than 40 F. Include the following:
- Use a department-accepted HMA mix design that incorporates a warm mix additive from the department's approved products list. Do not use a foaming process that introduces water into the mix.
  - Use additional rollers.

- (2) Engineer written acceptance is required for the cold weather paving plan. Engineer acceptance of the plan does not relieve the contractor of responsibility for pavement performance except as specified in 450.5(4).

**460.3.4.2 Cold Weather Paving Operations**

- (1) Do not place asphaltic mixture when the air temperature approximately 3 feet above grade, in shade, and away from artificial heat sources is less than 40 F unless a valid engineer-accepted cold weather paving plan is in effect.
- (2) If the national weather service forecast for the construction area predicts ambient air temperature less than 40 F at the projected time of paving within the next 24 hours, confirm or submit revisions to a previously engineer-accepted cold weather paving plan for engineer validation. Upon validation of the plan, the engineer will allow paving for the next day. Once in effect, pave conforming to the engineer-accepted cold weather paving plan for the balance of that work day or shift regardless of the temperature at the time of paving.

**460.4 Measurement**

*Add paragraph two as follows effective with the January 2015 letting:*

- (2) The department will measure HMA Cold Weather Paving by the ton of HMA mixture for pavement placed conforming to an engineer-accepted cold weather paving plan.

**460.5.1 General**

*Revise paragraph one as follows effective with the January 2015 letting:*

- (1) The department will pay for measured quantities at the contract unit price under the following bid items:

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
460.1100	HMA Pavement Type E-0.3	TON
460.1101	HMA Pavement Type E-1	TON
460.1103	HMA Pavement Type E-3	TON
460.1110	HMA Pavement Type E-10	TON
460.1130	HMA Pavement Type E-30	TON
460.1132	HMA Pavement Type E-30X	TON
460.1700	HMA Pavement Type SMA	TON
460.2000	Incentive Density HMA Pavement	DOL
460.4000	HMA Cold Weather Paving	TON

**460.5.2.2 Disincentive for HMA Pavement Density**

*Revise paragraph two as follows effective with the January 2015 letting:*

- (2) The department will not assess density disincentives for pavement placed in cold weather because of a department-caused delay as specified in 450.5(4).

**460.5.2.4 Cold Weather Paving**

*Add a new subsection as follows effective with the May 2015 letting:*

**460.5.2.4 Cold Weather Paving**

- (1) Payment for HMA Cold Weather Paving is full compensation for additional materials and equipment specified for cold weather paving under 460.3.4 including costs for preparing, administering, and following the contractor's cold weather paving plan. The department will not pay for HMA Cold Weather Paving for HMA placed on days when the department is assessing liquidated damages.
- (2) If HMA pavement is placed under 460.3.4 and the HMA Cold Weather Paving bid item is not in the contract, the department will pay for the additional costs specified in 460.5.2.4(1) as extra work. The department will pay separately for HMA pavement under the appropriate HMA Pavement bid items.

**465.2 Materials**

*Replace paragraph two with the following effective with the December 2014 letting:*

- (2) Under the other 465 bid items, the contractor need not submit a mix design. Furnish aggregates mixed with a type AC asphaltic material, except under the Asphaltic Curb bid item furnish PG58-28 asphaltic material. Use coarse and fine mineral aggregates uniformly coated and mixed with the asphaltic material in an engineer-approved mixing plant. The contractor may include reclaimed asphaltic pavement materials in the mixture.

**506.3.2 Shop Drawings**

Replace the entire text with the following effective with the May 2015 letting:

- (1) Ensure that shop drawings conform to the contract plans and provide additional details, dimensions, computations, and other information necessary for completely fabricating and erecting the work. Include project and structure numbers on each shop drawing sheet.
- (2) Check shop drawings and submit electronically to the department for review before beginning fabrication. For primary fabrication items, also certify that shop drawings conform to quality control standards by submitting department form DT2333. Department review does not relieve the contractor from responsibility for errors or omissions on shop drawings.
- (3) Shop drawings are part of the contract. The department must approve differences between shop drawings and contract plans. The contractor bears the costs of department-approved substitutions. Do not deviate from or revise drawings without notifying the department and resubmitting revised drawings.
- (4) Ensure that the fabricator delivers 3 sets of shop drawings for railroad structures to the railroad company upon contract completion.

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**Bid Items Added**

Add the following new bid item effective with the January 2015 letting:

<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT</u>
460.4000	HMA Cold Weather Paving	TON

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**Errata**

Make the following corrections to the standard specifications:

**501.3.2.4.4 Water Reducer**

Correct errata by deleting the reference to footnote 6 for grade D concrete.

- (1) Add a water reducing admixture conforming to 501.2.3. Determine the specific type and rate of use based on the atmospheric conditions, the desired properties of the finished concrete and the manufacturer's recommended rate of use. The actual rate of use shall at least equal the manufacturer's recommended rate, and both the type and rate used require the engineer's approval before use.

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**506.5 Payment**

Correct errata by changing the reference to 506.3.22.

- (9) The department will limit costs for inspections conducted under 506.3.22 to \$0.05 per pound of material and deduct costs in excess of that amount from payment due the contractor. The department will determine costs for in-house inspections based on hourly rates for department staff plus overhead and use invoiced costs for contracted-out inspections. The department will administer deductions for the contractor's share of the total inspection cost under the Excess Costs For Fabrication Shop Inspection administrative item.



**ADDITIONAL SPECIAL PROVISION 7**

- A. Reporting 1<sup>st</sup> Tier and DBE Payments During Construction
1. Comply with reporting requirements specified in the department's Civil Rights Compliance, Contractor's User Manual, Sublets and Payments.
  2. Report payments to all DBE firms within 10 calendar days of receipt of a progress payment by the department or a contractor for work performed, materials furnished, or materials stockpiled by a DBE firm. Report the payment as specified in A(1) for all work satisfactorily performed and for all materials furnished or stockpiled.
  3. Report payments to all first tier subcontractor relationships within 10 calendar days of receipt of a progress payment by the department for work performed. Report the payment as specified in A(1) for all work satisfactorily performed.
  4. All tiers shall report payments as necessary to comply with the DBE payment requirement as specified in A(2).
  5. Require all first tier relationships, DBE firms and all other tier relationships necessary to comply with the DBE payment requirement in receipt of a progress payment by contractor to acknowledge receipt of payment as specified in A(1), (2), (3) and (4).
  6. All agreements made by a contractor shall include the provisions in A(1), (2), (3), (4) and (5), and shall be binding on all first tier subcontractor relationships and all contractors and subcontractors utilizing DBE firms on the project.
- B. Costs for conforming to this special provision are incidental to the contract.



**ADDITIONAL SPECIAL PROVISION 9**  
**Electronic Certified Payroll Submittal**

(1) Use the department's Civil Rights Compliance System (CRCS) to submit certified payrolls electronically. Details are available online through the department's highway construction contractor information (HCCI) site on the Labor, Wages, and EEO Information page at:

<http://www.dot.wi.gov/business/civilrights/laborwages/index.htm>

(2) Ensure that all tiers of subcontractors, as well as all trucking firms, submit their weekly certified payrolls electronically through CRCS. These payrolls are due within seven calendar days following the close of the payroll period. Every firm providing physical labor towards completing the project is a subcontractor under this special provision.

(3) Upon receipt of contract execution, promptly make all affected firms aware of the requirements under this special provision and arrange for them to receive CRCS training as they are about to begin payrolls. The department will provide training either in a classroom setting at one of our regional offices or by telephone. Contact Tess Mulrooney at 608-267-4489 to schedule the training.

(4) The department will reject all paper submittals of forms DT-1816 and DT-1929 for information required under this special provision. All costs for conforming to this special provision are incidental to the contract.

(5) Firms wishing to export payroll data from their computer system into CRCS should have their payroll coordinator send several sample electronic files to Tess two months before a payroll needs to be submitted. Not every contractor's payroll system is capable of producing export files. For details, see pages 17-22 of the CRCS System Background Information manual available online on the Labor, Wages, and EEO Information page at:

<http://www.dot.wi.gov/business/civilrights/laborwages/docs/crc-payroll-manual.pdf>



**DECEMBER 2013**

**BUY AMERICA PROVISION**

All steel and iron materials permanently incorporated in this project shall be domestic products and all manufacturing and coating processes for these materials from smelting forward in the manufacturing process must have occurred within the United States. Coating includes epoxy coating, galvanizing, painting and any other coating that protects or enhances the value of a material subject to the requirements of Buy America. The exemption of this requirement is the minimal use of foreign materials if the total cost of such material permanently incorporated in the product does not exceed one-tenth of one percent (1/10 of 1%) of the total contract cost or \$2,500.00, whichever is greater. For purposes of this paragraph, the cost is that shown to be the value of the subject products as they are delivered to the project. The contractor shall take actions and provide documentation conforming to CMM 2-28.5 to ensure compliance with this "Buy America" provision.

<http://roadwaystandards.dot.wi.gov/standards/cmm/cm-02-28.pdf#cm2-28.5>

Upon completion of the project certify to the engineer, in writing using department form WS4567, that all steel, iron, and coating processes for steel or iron incorporated into the contract work conform to these "Buy America" provisions. Attach a list of exemptions and their associated costs to the certification form. Department form WS4567 is available at:

<http://roadwaystandards.dot.wi.gov/standards/forms/ws4567.doc>

**Effective with September 2004 Letting**

**WISCONSIN DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS AND TRANSPORTATION FACILITIES**

**SUPPLEMENTAL REQUIRED CONTRACT PROVISIONS**

- I. Wage Rates, Hours of labor and payment of Wages
- II. Payroll Requirements
- III. Postings at the Site of the Work
- IV. Affidavits
- V. Wage Rate Redistribution
- VI. Additional Classifications

**I. WAGE RATES, HOURS OF LABOR AND PAYMENT OF WAGES**

The schedule of "Minimum Wage Rates" attached hereto and made a part hereof furnishes the prevailing wage rates that have been determined pursuant to Section 103.50 of the Wisconsin Statutes. These wage rates are the minimum required to be paid to the various laborers, workers, mechanics and truck drivers employed by contractors and subcontractors on the construction work embraced by the contract and subject to prevailing hours and wages under Section 103.50, Stats. If necessary to employ laborers, workers, mechanics or truck drivers whose classification is not listed on the schedule, they shall be paid at rates conformable to those listed for similar classifications. Apprentices shall be paid at rates not less than those prescribed in their state indenture contracts.

While the wage rates shown are the minimum rates required by the contract to be paid during its life, this is not a representation that labor can be obtained at these rates. It is the responsibility of bidders to inform themselves as to the local labor conditions and prospective changes or adjustments of wage rates. No increase in the contract price shall be allowed or authorized on account of the payment of wage rates in excess of those listed herein.

Pursuant to Section 103.50 of the Wisconsin Statutes, the prevailing hours of labor have been determined to be up to 10 hours per day and 40 hours per calendar week Monday through Friday. If any laborer, worker, mechanic or truck driver is permitted or required to work more than the prevailing number of hours per day or per calendar week on this contract, they shall be paid for all hours in excess of the prevailing hours at a rate of at least one and one-half (1 1/2) times their hourly rate of pay. All work on Saturday, Sunday and the following holidays is to be paid at time and a half: (1) January 1, (2) the last Monday in May, (3) July 4, (4) the first Monday in September, (5) the fourth Thursday in November, (6) December 25, (7) the day before if January 1, July 4 or December 25 falls on a Saturday and (8) the day following if January 1, July 4 or December 25 falls on a Sunday.

All laborers, workers, mechanics and truck drivers shall be paid unconditionally not less often than once a week. Persons who own and operate their own trucks must receive the prevailing truck driver rate for the applicable type of truck (i.e. 2 axle, 3 or more axle, articulated, eculid or dumptor) he or she operates, plus an agreed upon amount for the use of his or her truck. Every owner-operator MUST be paid separately for their driving and for the use of their truck.

For those projects subject to the requirements of the Davis-Bacon Act, the Secretary of Labor will also have determined "Minimum Wage Rates" for work to be performed under the contract. These rates are, for all or most of the labor, worker, mechanic or truck driver classifications, identical to those established under Section 103.50 of the Wisconsin Statutes. In the event the rates are not identical, the higher of the two rates will govern.

## **II. PAYROLL REQUIREMENTS**

All contractors and subcontractors must submit weekly Certified Payrolls and Compliance Statement verifying that all laborers, workers, mechanics and truck drivers working on the project have been paid the prevailing wage rates for all work performed under the contract required by Section 103.50 of the Wisconsin Statutes.

## **III. POSTINGS AT THE SITE OF THE WORK**

In addition to the required postings furnished by the Department, the contractor shall post the following in at least one conspicuous place at the site of work:

- a. "NOTICE TO EMPLOYEES," which provides information required to be posted by the provisions of Section 103.50 of the Wisconsin Statutes.
- b. A copy of the State of Wisconsin Minimum Wages Rates. (Four pages.)
- c. A copy of the contractor's Equal Employment Opportunity Policy.
- d. On any project involving federal aid, in addition to the furnished postings, the contractor shall post a copy of the "Davis-Bacon Act, Minimum Wage Rates". (Three pages.)

## **IV. WAGE RATE REDISTRIBUTION**

The amount specified as the hourly basic rate of pay and the amount(s) specified as the fringe benefit contribution(s), for all classes of laborers, workers, mechanics or truck drivers may be redistributed, when necessary, to conform to those specified in any applicable collective bargaining agreement, provided that both parties to such agreement

request and receive the approval for any such redistribution from both the Department of Transportation and the Department of Workforce Development prior to the implementation of such redistribution.

## **V. ADDITIONAL CLASSIFICATIONS**

Any unlisted laborer or mechanic classification that is needed to perform work on this project, and is not included within the scope of any of the classifications listed in the application prevailing wage rate determination, may be added after award only if all of the following criteria have been met:

1. The affected employer(s) must make a written request to WisDOT Central Office to utilize the unlisted classification on this project.
2. The request must indicate the scope of the work to be performed by the unlisted classification and must indicate the proposed wage/fringe benefit package that the unlisted classification is to receive.
3. The work to be performed by the unlisted classification must not be performed by a classification that is included in the applicable prevailing wage rate determination.
4. The unlisted classification must be commonly employed in the area where the project is located.
5. The proposed wage/fringe benefit package must bear a reasonable relationship to those set forth in the applicable prevailing wage rate determination.
6. The request should be made prior to the actual performance of the work by the unlisted classification.
7. DWD must approve the use of the unlisted classification and the proposed wage/fringe benefit package. USDOL also must approve the use of the unlisted classification and the proposed wage/fringe benefit package on federal aid projects.
8. WisDOT and DWD may amend the proposed wage/fringe benefit package, as deemed necessary, and may set forth specific employment ratios and scope of work requirements in the approval document.

The approved wage/fringe benefit package shall be paid to all laborers, workers, mechanics or truck drivers performing work within the scope of that performed by the unlisted classification, from the first day on which such work is performed. In the event that work is performed by the unlisted classification prior to approval, the wage/fringe benefit package to be paid for such work must be in conformance with the wage/fringe



benefit package approved for such work. Under this arrangement a retroactive adjustment in wages and/or fringe benefits may be required to be made to the affected laborers, workers, mechanics or truck drivers by the affected employer(s).

**ANNUAL PREVAILING WAGE RATE DETERMINATION  
FOR ALL STATE HIGHWAY PROJECTS  
COLUMBIA COUNTY**

Compiled by the State of Wisconsin - Department of Workforce Development  
for the Department of Transportation  
Pursuant to s. 103.50, Stats.  
Issued on May 1, 2015

**CLASSIFICATION:** Contractors are required to call the Department of Workforce Development if there are any questions regarding the proper trade or classification to be used for any worker on a public works project.

**OVERTIME:** Time and one-half must be paid for all hours worked over 10 hours per day and 40 hours per calendar week and for all hours worked on Saturday, Sunday and the following six (6) holidays: January 1; the last Monday in May; July 4; the 1st Monday in September; the 4th Thursday in November; December 25; the day before if January 1, July 4 or December 25 falls on a Saturday; the day following if January 1, July 4 or December 25 falls on a Sunday.

**FUTURE INCREASE:** If indicated for a specific trade or occupation, the full amount of such increase MUST be added to the "TOTAL" indicated for such trade or occupation on the date(s) such increase(s) becomes effective.

**PREMIUM PAY:** If indicated for a specific trade or occupation, the full amount of such pay MUST be added to the "HOURLY BASIC RATE OF PAY" indicated for such trade or occupation, whenever such pay is applicable.

**SUBJOURNEY:** Wage rates may be available for some of the classifications indicated below. Any employer that desires to use any subjourney classification on a project MUST request the applicable wage rate from the Department of Workforce Development PRIOR to the date such classification is used on such project. Form ERD-10880 is available for this purpose and can be obtained by writing to the Department of Workforce Development, Equal Rights Division, P.O. Box 8928, Madison, WI 53708.

<u>TRADE OR OCCUPATION</u>	<u>HOURLY BASIC RATE OF PAY</u>	<u>HOURLY FRINGE BENEFITS</u>	<u>TOTAL</u>
	\$	\$	\$
Bricklayer, Blocklayer or Stonemason	32.29	17.84	50.13
Carpenter	32.72	16.00	48.72
Future Increase(s): Add \$1.42/hr on 6/1/2015; Add \$1.42/hr on 6/1/2016. Premium Pay: DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.			
Cement Finisher	35.18	16.78	51.96
Future Increase(s): Add \$1.87 on 6/1/15; Add \$1.75 on 6/1/16. Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.40/hr when the Wisconsin Department of Transportation or responsible governing agency requires that work be performed at night under artificial illumination with traffic control and the work is completed after sunset and before sunrise.			
Electrician	33.93	22.77	56.70
Premium Pay: DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.			
Fence Erector	18.50	7.02	25.52
Ironworker	31.50	20.01	51.51
Line Constructor (Electrical)	39.50	17.73	57.23
Painter	26.65	13.10	39.75
Pavement Marking Operator	29.22	25.90	55.12
Piledriver	30.11	26.51	56.62
Future Increase(s): Add \$1.50/hr on 6/1/2015; Add \$1.60/hr on 6/1/2016. Premium Pay: Add \$.65/hr for Piledriver Loftsmen; Add \$.75/hr for Sheet Piling Loftsmen. DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.			
Rofer or Waterproofer	29.40	4.04	33.44
Teledata Technician or Installer	22.25	12.24	34.49

<b>TRADE OR OCCUPATION</b>	<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
	<b>\$</b>	<b>\$</b>	<b>\$</b>
Tuckpointer, Caulker or Cleaner	23.60	7.10	30.70
Underwater Diver (Except on Great Lakes)	35.40	15.90	51.30
Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	35.55	15.57	51.12
Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY	31.60	15.29	46.89
Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	27.65	13.44	41.09
Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	25.68	12.83	38.51
Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	21.73	12.17	33.90

**TRUCK DRIVERS**

Single Axle or Two Axle	25.18	18.31	43.49
Future Increase(s): Add \$1.15/hr on 6/1/2015. Premium Pay: DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.			
Three or More Axle	25.28	18.31	43.59
Future Increase(s): Add \$1.15/hr on 6/1/2015. Premium Pay: DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.			
Articulated, Euclid, Dumptror, Off Road Material Hauler	30.27	21.15	51.42
Future Increase(s): Add \$1.25/hr on 6/1/2015; Add \$1.30/hr on 6/1/2016; Add \$1.25/hr on 6/1/2017. Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.50/hr night work premium. See DOT'S website for details about the applicability of this night work premium at: <a href="http://www.dot.wi.gov/business/civilrights/laborwages/pwc.htm">http://www.dot.wi.gov/business/civilrights/laborwages/pwc.htm</a> .			
Pavement Marking Vehicle	23.16	20.48	43.64
Shadow or Pilot Vehicle	24.37	17.77	42.14
Truck Mechanic	24.52	17.77	42.29

**LABORERS**

General Laborer	30.13	15.14	45.27
Future Increase(s): Add \$1.05/hr eff. 06/01/2015; Add \$1.00/hr eff. 06/01/2016; Add \$1.00/hr eff. 06/01/2017 Premium Pay: Add \$.10/hr for topman, air tool operator, vibrator or tamper operator (mechanical hand operated), chain saw operator and demolition burning torch laborer; Add \$.15/hr for bituminous worker (raker and luteman), formsetter (curb, sidewalk and pavement) and strike off man; Add \$.20/hr for blaster and powderman; Add \$.25/hr for bottomman; Add \$.35/hr for line and grade specialist; Add \$.45/hr for pipelayer. DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr for work on projects involving temporary traffic control setup, for lane and shoulder closures, when work under artificial illumination conditions is necessary as required by the project provisions (including prep time prior to and/or cleanup after such time period).			
Asbestos Abatement Worker	24.13	14.15	38.28
Landscaper	30.41	15.14	45.55
Future Increase(s): Add \$1.05/hr eff. 06/01/2015; Add \$1.00/hr eff. 06/01/2016; Add \$1.00/hr eff. 06/01/2017 Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr for work on projects involving temporary traffic control setup, for lane and shoulder closures, when work under artificial illumination conditions is necessary as required by the project provisions (including prep time prior to and/or cleanup after such time period).			

<b>TRADE OR OCCUPATION</b>	<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
	<b>\$</b>	<b>\$</b>	<b>\$</b>
Flagperson or Traffic Control Person	26.76	15.14	41.90
Future Increase(s): Add \$1.05/hr eff. 06/01/2015; Add \$1.00/hr eff. 06/01/2016; Add \$1.00/hr eff. 06/01/2017			
Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr when the Wisconsin Department of Transportation or responsible governing agency requires that work be performed at night under artificial illumination with traffic control and the work is completed after sunset and before sunrise.			
Fiber Optic Laborer (Outside, Other Than Concrete Encased)	18.33	13.65	31.98
Railroad Track Laborer	14.50	4.77	19.27

### HEAVY EQUIPMENT OPERATORS

Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 176 Ft or Over; Crane, Tower Crane, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons, Self-Erecting Tower Crane With a Lifting Capacity Of Over 4,000 Lbs., Crane With Boom Dollies; Traveling Crane (Bridge Type).	37.72	21.15	58.87
Future Increase(s): Add \$1.25/hr on 6/1/2015; Add \$1.30/hr on 6/1/2016; Add \$1.25/hr on 6/1/2017.			
Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.50/hr night work premium.			
See DOT'S website for details about the applicability of this night work premium at: <a href="http://www.dot.wi.gov/business/civilrights/laborwages/pwc.htm">http://www.dot.wi.gov/business/civilrights/laborwages/pwc.htm</a> .			
Backhoe (Track Type) Having a Mfr.'s Rated Capacity of 130,000 Lbs. or Over; Caisson Rig; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 175 Ft or Under; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under, Self-Erecting Tower Crane With A Lifting Capacity Of 4,000 Lbs., & Under; Dredge (NOT Performing Work on the Great Lakes); Licensed Boat Pilot (NOT Performing Work on the Great Lakes); Pile Driver.	37.22	21.15	58.37
Future Increase(s): Add \$1.25/hr on 6/1/2015; Add \$1.30/hr on 6/1/2016; Add \$1.25/hr on 6/1/2017.			
Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.50/hr night work premium.			
See DOT'S website for details about the applicability of this night work premium at: <a href="http://www.dot.wi.gov/business/civilrights/laborwages/pwc.htm">http://www.dot.wi.gov/business/civilrights/laborwages/pwc.htm</a> .			
Air Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Asphalt Heater, Planer & Scarifier; Asphalt Milling Machine; Asphalt Screed; Automatic Subgrader (Concrete); Backhoe (Track Type) Having a Mfr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Bituminous (Asphalt) Plant & Paver, Screed; Boatmen (NOT Performing Work on the Great Lakes); Boring Machine (Directional, Horizontal or Vertical); Bridge (Bidwell) Paver; Bulldozer or Endloader; Concrete Batch Plant, Batch Hopper; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Concrete Bump Cutter, Grinder, Planing or Grooving Machine; Concrete Conveyor System; Concrete Laser/Screed; Concrete Paver (Slipform); Concrete Pump, Concrete Conveyor (Rotec or Bidwell Type); Concrete Slipform Placer Curb & Gutter Machine; Concrete Spreader & Distributor; Crane (Carry Deck, Mini) or Truck Mounted Hydraulic Crane (10 Tons or Under); Crane With a Lifting Capacity of 25 Tons or Under; Forestry Equipment, Timbco, Tree Shear, Tub Grinder, Processor; Gradall (Cruz-Aire Type); Grader or Motor Patrol; Grout Pump; Hydro-Blaster (10,000 PSI or Over); Loading Machine (Conveyor);	36.72	21.15	57.87

<u>TRADE OR OCCUPATION</u>	<u>HOURLY BASIC RATE OF PAY</u>	<u>HOURLY FRINGE BENEFITS</u>	<u>TOTAL</u>
	\$	\$	\$
Material or Stack Hoist; Mechanic or Welder; Milling Machine; Post Hole Digger or Driver; Roller (Over 5 Ton); Scraper (Self Propelled or Tractor Drawn) 5 cu yds or More Capacity; Shoulder Widener; Sideboom; Skid Rig; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); Straddle Carrier or Travel Lift; Tractor (Scraper, Dozer, Pusher, Loader); Tractor or Truck Mounted Hydraulic Backhoe; Trencher (Wheel Type or Chain Type); Tube Finisher; Tugger (NOT Performing Work on the Great Lakes); Winches & A- Frames. Future Increase(s): Add \$1.25/hr on 6/1/2015; Add \$1.30/hr on 6/1/2016; Add \$1.25/hr on 6/1/2017. Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.50/hr night work premium. See DOT'S website for details about the applicability of this night work premium at: <a href="http://www.dot.wi.gov/business/civilrights/laborwages/pwc.htm">http://www.dot.wi.gov/business/civilrights/laborwages/pwc.htm</a> .			
Belting, Burlap, Texturing Machine; Broom or Sweeper; Compactor (Self-Propelled or Tractor Mounted, Towed & Light Equipment); Concrete Finishing Machine (Road Type); Environmental Burner; Farm or Industrial Type Tractor; Fireman (Asphalt Plant, Pile Driver & Derrick NOT Performing Work on the Great Lakes); Forklift; Greaser; Hoist (Tugger, Automatic); Jeep Digger; Joint Sawyer (Multiple Blade); Launch (NOT Performing Work on the Great Lakes); Lift Slab Machine; Mechanical Float; Mulcher; Power Subgrader; Robotic Tool Carrier (With or Without Attachments); Roller (Rubber Tire, 5 Ton or Under); Self Propelled Chip Spreader; Shouldering Machine; Skid Steer Loader (With or Without Attachments); Telehandler; Tining or Curing Machine. Future Increase(s): Add \$1.25/hr on 6/1/2015; Add \$1.30/hr on 6/1/2016; Add \$1.25/hr on 6/1/2017. Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.50/hr night work premium. See DOT'S website for details about the applicability of this night work premium at: <a href="http://www.dot.wi.gov/business/civilrights/laborwages/pwc.htm">http://www.dot.wi.gov/business/civilrights/laborwages/pwc.htm</a> .	36.46	21.15	57.61
Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Augers (Vertical & Horizontal); Automatic Belt Conveyor & Surge Bin; Boiler (Temporary Heat); Concrete Proportioning Plant; Crusher, Screening or Wash Plant; Generator (&/or 150 KW or Over); Heaters (Mechanical); High Pressure Utility Locating Machine (Daylighting Machine); Mudjack; Oiler; Prestress Machine; Pug Mill; Pump (3 Inch or Over) or Well Points; Rock, Stone Breaker; Screed (Milling Machine); Stump Chipper; Tank Car Heaters; Vibratory Hammer or Extractor, Power Pack. Future Increase(s): Add \$1.25/hr on 6/1/2015; Add \$1.30/hr on 6/1/2016; Add \$1.25/hr on 6/1/2017. Premium Pay: DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.50/hr night work premium. See DOT'S website for details about the applicability of this night work premium at: <a href="http://www.dot.wi.gov/business/civilrights/laborwages/pwc.htm">http://www.dot.wi.gov/business/civilrights/laborwages/pwc.htm</a> .	36.17	21.15	57.32
Fiber Optic Cable Equipment.	28.89	17.95	46.84

SUPERSEDES DECISION WI20120010  
U. S. DEPARTMENT OF LABOR  
(DAVIS-BACON ACT, MINIMUM WAGE RATES)

STATE: Wisconsin

GENERAL DECISION NUMBER: WI150010

DESCRIPTION OF WORK: Highways and Airport Runway and Taxiway Construction

DATE: March 20, 2015

LABORERS CLASSIFICATION:	Basic Hourly Rates	Fringe Benefits	Truck Drivers:	Basic Hourly Rates	Fringe Benefits
Group 1: General Laborer; Tree Trimmer; Conduit Layer; Demolition and Wrecking Laborer; Guard Rail, Fence and Bridge Builder; Landscaper, Multiplate Culvert Assembler; Stone Handler; Bituminous Worker (Shoveler, Loader, Utility Man); Batch Truck Dumper; or Cement Handler; Bituminous Worker; (Dumper, Ironer, Smoother, Tamper); Concrete Handler .....	\$29.04 .....	14.53	1 & 2 Axles .....	25.18 .....	18.31
Group 2: Air Tool Operator; Joint Sawyer and Filler (Pavement); Vibrator or Tamper Operator (Mechanical Hand Operated); .....	29.14 .....	14.53	Three or More Axles; Euclids, Dumptor & Articulated, Truck Mechanic.....	25.38 .....	18.31
Group 3: Bituminous Worker (Raker and Luteman); Formsetter (Curb, Sidewalk, and Pavement); Strike Off man.....	29.19 .....	14.53			
Group 4: Line and Grade Specialist .....	29.39 .....	14.53			
Group 5: Blaster and Powderman .....	29.24 .....	14.53			
Group 6: Flagperson; Traffic Control .....	25.67 .....	14.53			

CLASSES OF LABORER AND MECHANICS

Bricklayer .....	32.28 .....	18.10
Carpenter .....	30.48 .....	15.80
Millwright .....	32.11 .....	15.80
Piledriverman .....	30.98 .....	15.80
Ironworker .....	31.50 .....	20.03
Cement Mason/Concrete Finisher .....	32.65 .....	17.44
Electrician .....	See Page 3	
Line Construction		
Lineman.....	40.81 .....	32% + 5.00
Heavy Equipment Operator .....	38.77 .....	32% + 5.00
Equipment Operator.....	32.65 .....	32% + 5.00
Heavy Groundman Driver.....	26.78 .....	14.11
Light Groundman Driver .....	24.86 .....	13.45
Groundsman.....	22.45 .....	32% + 5.00
Painter, Brush .....	24.50 .....	16.27
Painter, Spray, Structural Steel, Bridges.....	25.50 .....	16.27
Well Drilling:		
Well Driller.....	16.52 .....	3.70

Notes: Welders receive rate prescribed for craft performing operation to which welding is incidental. Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR, 5.5(a)(1)(ii)). Includes Modification #0 dated January 2, 2015; Modification #1 dated January 16, 2015; Modification #2 dated March 20, 2015.

State of Wisconsin Department of Workforce Development Equal Rights Division	<b>DEPARTMENTAL ORDER</b>
<b>ISSUE DATE:</b> 3/26/2015	
<b>PROJECT:</b>	
SOUTH FERRY LANDING WAYSIDE LODI-MERRIMAC WEST POINT TOWN, COLUMBIA COUNTY, WI Determination No. 201501138 [Owner Project No. 5640-02-81]	
<b>PROJECT OWNER:</b>	<b>REQUESTER:</b>
ROBERT SPOERL, ROADSIDE FACILITIES ENGINEER DEPARTMENT OF TRANSPORTATION 4802 SHEBOYGAN AVE. 501 MADISON, WI 53705	RAINE L GARDNER, ENGINEER MSA PROFESSIONAL SERVICES 1230 SOUTH BOULEVARD BARABOO, WI 53913
<b>ADDITIONAL CONTACT:</b>	<b>NOTE:</b> The Requester must provide a copy of this Project Determination and enclosures to the Project Owner and Additional Contact.
<p>The department received an application for prevailing wage rate determination for the above-captioned project. The department conducted a survey to determine the prevailing wage rate for the trade(s) or occupation(s) needed to complete the project. The survey's findings appear in the attached project determination.</p> <p>If you believe that the wage rate for any trade or occupation does not accurately reflect the prevailing wage rate in the city, village or town where the project is located, you may ask the department to conduct an administrative review of such wage rate. You must submit this request in writing within 30 days from the date indicated above. Additionally, your request must include wage rate information from at least three similar projects in the city, village or town where the proposed project is located and on which some work has been performed by the contested trade(s) during the current survey period and was previously considered by the department in issuing the attached determination. See DWD 290.10 of the Wisconsin Administrative Code and either s. 66.0903(3)(br), Stats., or s. 103.49(3)(c), Stats., for a complete explanation of the administrative review process.</p> <p>Enclosures</p>	
<p>It is hereby ordered that the prevailing wage rates set forth in the attached project determination shall only be applicable to the above referenced project. This order is a <b>FINAL ORDER</b> of the department unless a timely request for an administrative review is filed with the department.</p> <p><b>ISSUED BY:</b></p> <p style="text-align: center;">Equal Rights Division Labor Standards Bureau Construction Wage Standards Section P.O. Box 8928, Madison, WI 53708-8928 (608)266-6861</p> <p style="text-align: center;">Web Site: <a href="http://dwd.wisconsin.gov/er/">http://dwd.wisconsin.gov/er/</a></p>	

**PREVAILING WAGE RATE DETERMINATION**

Issued by the State of Wisconsin  
Department of Workforce Development  
Pursuant to s. 103.49, Wis. Stats.  
Issued On: 3/26/2015

**DETERMINATION NUMBER:** 201501138

**EXPIRATION DATE:** Prime Contracts MUST Be Awarded or Negotiated On Or Before 12/31/2015. If NOT, You MUST Reapply.

**PROJECT NAME:** SOUTH FERRY LANDING WAYSIDE LODI-MERRIMAC  
PROJECT NO: 5640-02-81

**PROJECT LOCATION:** WEST POINT TOWN, COLUMBIA COUNTY, WI

**CONTRACTING AGENCY:** DEPARTMENT OF TRANSPORTATION

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



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

**The following statutory provisions apply to state agency projects of public works and are set forth below pursuant to the requirements of s. 103.49(3)(a), Stats.**

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

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

**s. 103.49 (2) PREVAILING WAGE RATES AND HOURS OF LABOR.**

Any contract made for the erection, construction, remodeling, repairing, or demolition of any project of public works to which the state or any state agency is a party shall contain a stipulation that no person performing the work described in sub. (2m) may be permitted to work a greater number of hours per day or per week than the prevailing hours of labor, except that any such person may be permitted or required to work more than such prevailing hours of labor per day and per week if he or she is paid for all hours worked in excess of the prevailing hours of labor at a rate of at least 1.5 times his or her hourly basic rate of pay; nor may he or she be paid less than the prevailing wage rate determined under sub. (3) in the same or most similar trade or occupation in the area in which the project of public works is situated. A reference to the prevailing wage rates determined under sub. (3) and the prevailing hours of labor shall be published in the notice issued for the purpose of securing bids for the project. If any contract or subcontract for a project of public works that is subject to this section is entered into, the prevailing wage rates determined under sub. (3) and the prevailing hours of labor shall be physically incorporated into and made a part of the contract or subcontract, except that for a minor subcontract, as determined by the department, the department shall prescribe by rule the method of notifying the minor subcontractor of the prevailing wage rates and prevailing hours of labor applicable to the minor subcontract. The prevailing wage rates and prevailing hours of labor applicable to a contract or subcontract may not be changed during the time that the contract or subcontract is in force.

**s. 103.49 (6M) LIABILITY AND PENALTIES.**

- (ag) 1. Any contractor, subcontractor, or contractor's or subcontractor's agent who fails to pay the prevailing wage rate determined by the department under sub. (3) or who pays less than 1.5 times the hourly basic rate of pay for all hours worked in excess of the prevailing hours of labor is liable to any affected employee in the amount of his or her unpaid wages or his or her unpaid overtime compensation and in an additional amount as liquidated damages as provided in subd. 2., 3., whichever is applicable.
2. If the department determines upon inspection under sub. (5) (b) or (c) that a contractor, subcontractor, or contractor's or subcontractor's agent has failed to pay the prevailing wage rate determined by the department under sub. (3) or has paid less than 1.5 times the hourly basic rate of pay for all hours worked in excess of the prevailing hours of labor, the department shall order the contractor to pay to any affected employee the amount of his or her unpaid wages or his or her unpaid overtime compensation and an additional amount equal to 100 percent of the amount of those unpaid wages or that unpaid overtime compensation as liquidated damages within a period specified by the department in the order.
3. In addition to or in lieu of recovering the liability specified in subd. 1. as provided in subd. 2., any employee for and in behalf of that employee and other employees similarly situated may commence an action to recover that liability in any court of competent jurisdiction. If the court finds that a contractor, subcontractor, or contractor's or subcontractor's agent has failed to pay the prevailing wage rate determined by the department under sub. (3) or has paid less than 1.5 times the hourly basic rate of pay for all hours worked in excess of the prevailing hours of labor, the court shall order the contractor, subcontractor, or agent to pay to any affected employee the amount of his or her unpaid wages or his or her unpaid overtime compensation and an additional amount equal to 100 percent of the amount of those unpaid wages or that unpaid overtime compensation as liquidated damages.

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

(am) Except as provided in pars. (b), (d) and (f), any contractor, subcontractor or contractor's or subcontractor's agent who violates this section may be fined not more than \$200 or imprisoned for not more than 6 months or both. Each day that a violation continues is a separate offense.

(b) Whoever induces any person who seeks to be or is employed on any project of public works that is subject to this section to give up, waive, or return any part of the wages to which the person is entitled under the contract governing the project, or who reduces the hourly basic rate of pay normally paid to a person for work on a project that is not subject to this section during a week in which the person works both on a project of public works that is subject to this section and on a project that is not subject to this section, by threat not to employ, by threat of dismissal from employment, or by any other means is guilty of an offense under s. 946.15 (1).

(c) Any person employed on a project of public works that is subject to this section who knowingly permits a contractor, subcontractor, or contractor's or subcontractor's agent to pay him or her less than the prevailing wage rate set forth in the contract governing the project, who gives up, waives, or returns any part of the compensation to which he or she is entitled under the contract, or who gives up, waives, or returns any part of the compensation to which he or she is normally entitled for work on a project that is not subject to this section during a week in which the person works both on a project of public works that is subject to this section and on a project that is not subject to this section, is guilty of an offense under s. 946.15 (2).

(d) Whoever induces any person who seeks to be or is employed on any project of public works that is subject to this section to permit any part of the wages to which the person is entitled under the contract governing the project to be deducted from the person's pay is guilty of an offense under s. 946.15 (3), unless the deduction would be permitted under 29 CFR 3.5 or 3.6 from a person who is working on a project that is subject to 40 USC 3142.

(e) Any person employed on a project of public works that is subject to this section who knowingly permits any part of the wages to which he or she is entitled under the contract governing the project to be deducted from his or her pay is guilty of an offense under s. 946.15 (4), unless the deduction would be permitted under 29 CFR 3.5 or 3.6 from a person who is working on a project that is subject to 40 USC 3142.

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

<b>SKILLED TRADES</b>
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Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
<u>CODE</u>	<u>TRADE OR OCCUPATION</u>	\$	\$	\$
101	Acoustic Ceiling Tile Installer Future Increase(s): Add \$1.42/hr on 6/1/2015; Add \$1.42/hr on 6/1/2016.	32.72	16.00	48.72
102	Boilermaker Future Increase(s): Add \$1.50/hr. on 01/01/2016	33.35	28.24	61.59
103	Bricklayer, Blocklayer or Stonemason Future Increase(s): Add \$1.40 on 06/01/2015; Add \$1.45 on 06/06/2016 Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	32.80	18.67	51.47
104	Cabinet Installer Future Increase(s): Add \$1.42/hr on 6/1/2015; Add \$1.42/hr on 6/1/2016.	32.72	16.00	48.72
105	Carpenter Future Increase(s): Add \$1.42/hr on 6/1/2015; Add \$1.42/hr on 6/1/2016. Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	32.72	16.00	48.72
106	Carpet Layer or Soft Floor Coverer Future Increase(s): Add \$1.42/hr on 6/1/2015; Add \$1.42/hr on 6/1/2016.	32.72	16.00	48.72
107	Cement Finisher	32.29	17.83	50.12
108	Drywall Taper or Finisher	31.40	14.40	45.80
109	Electrician Future Increase(s): Add \$1.20/hr on 6/1/15; Add \$1.25/hr on 6/1/16. Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	34.82	19.67	54.49
110	Elevator Constructor	43.84	27.09	70.93

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
111	Fence Erector	18.50	7.02	25.52
112	Fire Sprinkler Fitter	36.79	18.81	55.60
113	Glazier	27.75	6.65	34.40
114	Heat or Frost Insulator	33.43	25.75	59.18
115	Insulator (Batt or Blown) Future Increase(s): Add \$1.42/hr on 6/1/2015; Add \$1.42/hr on 6/1/2016.	32.72	16.00	48.72
116	Ironworker	31.50	20.01	51.51
117	Lather	31.40	15.90	47.30
118	Line Constructor (Electrical)	39.50	17.73	57.23
119	Marble Finisher	16.25	2.46	18.71
120	Marble Mason	32.29	17.84	50.13
121	Metal Building Erector	24.25	10.85	35.10
122	Millwright Future Increase(s): Add \$1.47/hr on 6/1/2015; Add \$1.47/hr on 6/1/2016.	34.44	16.07	50.51
123	Overhead Door Installer	27.46	1.98	29.44
124	Painter	15.00	0.00	15.00
125	Pavement Marking Operator	30.10	17.34	47.44
126	Piledriver Future Increase(s): Add \$1.50/hr on 6/1/2015; Add \$1.60/hr on 6/1/2016. Premium Increase(s): Add \$.65/hr for Piledriver Loftsmen; Add \$.75/hr for Sheet Piling Loftsmen. DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	30.11	26.51	56.62
127	Pipeline Fuser or Welder (Gas or Utility)	30.83	20.89	51.72
129	Plasterer Future Increase(s): Add \$1.56 on 06/01/2015; Add \$1.61 on 06/01/2016; Add \$1.66 on 06/01/2017	32.65	19.36	52.01
130	Plumber Future Increase(s): Add \$1.80 on 6/1/15	37.57	17.47	55.04
132	Refrigeration Mechanic Future Increase(s): Add \$1.80 on 6/1/15	44.20	18.26	62.46

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
133	Roofer or Waterproofer	29.40	4.04	33.44
134	Sheet Metal Worker	34.45	22.54	56.99
135	Steamfitter Future Increase(s): Add \$1.80/hr on 6/1/15.	44.20	18.26	62.46
137	Teledata Technician or Installer Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	22.50	12.74	35.24
138	Temperature Control Installer	42.95	14.47	57.42
139	Terrazzo Finisher	16.25	2.46	18.71
140	Terrazzo Mechanic	31.18	17.35	48.53
141	Tile Finisher	23.85	17.18	41.03
142	Tile Setter	29.81	17.18	46.99
143	Tuckpointer, Caulker or Cleaner	23.60	7.10	30.70
144	Underwater Diver (Except on Great Lakes)	35.40	15.90	51.30
146	Well Driller or Pump Installer	25.32	15.65	40.97
147	Siding Installer	36.17	19.44	55.61
150	Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	30.16	15.11	45.27
151	Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY	40.00	20.19	60.19
152	Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	37.00	18.87	55.87
153	Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	27.83	15.01	42.84
154	Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	21.90	9.83	31.73

**TRUCK DRIVERS**

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
201	Single Axle or Two Axle	32.89	19.05	51.94
203	Three or More Axle	18.00	20.85	38.85
204	Articulated, Euclid, Dumptor, Off Road Material Hauler Future Increase(s): Add \$1.60/hr on 6/2/2015; Add \$1.60/hr on 6/3/2016.	33.69	19.78	53.47

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
205	Pavement Marking Vehicle	20.85	11.02	31.87
207	Truck Mechanic	18.00	20.85	38.85

**LABORERS**

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b><u>CODE</u></b>	<b><u>TRADE OR OCCUPATION</u></b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
301	General Laborer Future Increase(s): Add \$1.35/hr eff. 06/01/2015; Add \$1.25/hr eff. 06/06/2016 Premium Increase(s): Add \$1.00/hr for certified welder; Add \$.25/hr for mason tender	24.97	15.12	40.09
302	Asbestos Abatement Worker	24.13	14.15	38.28
303	Landscaper	14.05	13.13	27.18
310	Gas or Utility Pipeline Laborer (Other Than Sewer and Water)	21.55	14.14	35.69
311	Fiber Optic Laborer (Outside, Other Than Concrete Encased) Premium Increase(s): DOT PREMIUMS: Pay two times the hourly basic rate on New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	18.82	14.16	32.98
314	Railroad Track Laborer	14.50	4.77	19.27
315	Final Construction Clean-Up Worker	24.21	18.16	42.37

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

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
501	Air Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Asphalt Milling Machine; Boring Machine (Directional, Horizontal or Vertical); Backhoe (Track Type) Having a Mfg's Rated Capacity of 130,000 Lbs. or Over; Backhoe (Track Type) Having a Mfg's Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Bulldozer or Endloader (Over 40 hp); Compactor (Self-Propelled 85 Ft Total Drum Width & Over, or Tractor Mounted, Towed & Light Equipment); Concrete Batch Plant, Batch Hopper; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Crane, Shovel, Dragline, Clamshells; Forklift (Machinery Moving or Steel Erection, 25 Ft & Over); Gradall (Cruz-Aire Type); Grader or Motor Patrol; Master Mechanic; Mechanic or Welder; Robotic Tool Carrier (With or Without Attachments); Scraper (Self Propelled or Tractor Drawn) 5 cu yds or More Capacity; Tractor or Truck Mounted Hydraulic Backhoe; Tractor or Truck Mounted Hydraulic Crane (10 Tons or Under); Tractor (Scraper, Dozer, Pusher, Loader); Trencher (Wheel Type or Chain Type Having Over 8 Inch Bucket). Future Increase(s): Add \$1.60/hr on 6/2/2015; Add \$1.60/hr on 6/3/2016.	33.69	19.78	53.47
502	Backfiller; Broom or Sweeper; Bulldozer or Endloader (Under 40 hp); Environmental Burner; Forestry Equipment, Timbco, Tree Shear, Tub Grinder, Processor; Jeep Digger; Screed (Milling Machine); Skid Rig; Straddle Carrier or Travel Lift; Stump Chipper; Trencher (Wheel Type or Chain Type Having 8 Inch Bucket & Under). Future Increase(s): Add \$1.60/hr on 6/2/2015; Add \$1.60/hr on 6/3/2016.	33.69	19.78	53.47
503	Air Compressor (&/or 400 CFM or Over); Augers (Vertical & Horizontal); Compactor (Self-Propelled 84 Ft Total Drum Width & Under, or Tractor Mounted, Towed & Light Equipment); Crusher, Screening or Wash Plant; Farm or Industrial Type Tractor; Forklift; Generator (&/or 150 KW or Over); Greaser; High Pressure Utility Locating Machine (Daylighting Machine); Mulcher; Oiler; Post Hole Digger or Driver; Pump (3 Inch or Over) or Well Points; Refrigeration Plant or Freeze Machine; Rock, Stone Breaker; Skid Steer Loader (With or Without Attachments); Vibratory Hammer or Extractor, Power Pack. Future Increase(s): Add \$1.60/hr on 6/2/2015; Add \$1.60/hr on 6/3/2016.	31.62	19.78	51.40
504	Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.	41.65	21.71	63.36
505	Work Performed on the Great Lakes Including Crane or Backhoe Operator; Assistant Hydraulic Dredge Engineer; Hydraulic Dredge Leverman or Diver's Tender; Mechanic or Welder; 70 Ton & Over Tug Operator. Premium Increase(s): Add \$.50/hr for Friction Crane, Lattice Boom or Crane Certification (CCO).	41.65	21.71	63.36

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
506	Work Performed on the Great Lakes Including Deck Equipment Operator or Machineryman (Maintains Cranes Over 50 Tons or Backhoes 115,000 Lbs. or More); Tug, Launch or Loader, Dozer or Like Equipment When Operated on a Barge, Breakwater Wall, Slip, Dock or Scow, Deck Machinery.	35.72	17.85	53.57
507	Work Performed on the Great Lakes Including Deck Equipment Operator, Machineryman or Fireman (Operates 4 Units or More or Maintains Cranes 50 Tons or Under or Backhoes 115,000 Lbs. or Under); Deck Hand, Deck Engineer or Assistant Tug Operator; Off Road Trucks - Great Lakes ONLY.	35.46	20.40	55.86

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

<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
508	Boring Machine (Directional); Crane, Tower Crane, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of Over 100 Tons, Self-Erecting Tower Crane With a Lifting Capacity of Over 4,000 Lbs., Crane With Boom Dollies; Crane, Tower Crane, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 176 Ft or Over; Master Mechanic. Future Increase(s): Add \$1.60/hr on 6/2/2015; Add \$1.60/hr on 6/3/2016. Premium Increase(s): Add \$.50/hr for >200 Ton; Add \$1/hr at 300 Ton; Add \$1.50/hr at 400 Ton; Add \$2/hr at 500 Ton & Over.	36.67	19.78	56.45
509	Backhoe (Track Type) Having a Mfgr's Rated Capacity of 130,000 Lbs. or Over; Boring Machine (Horizontal or Vertical); Caisson Rig; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With or Without Attachments, With a Lifting Capacity of 100 Tons or Under, Self-Erecting Tower Crane With A Lifting Capacity Of 4,000 Lbs. & Under; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With Boom, Leads &/or Jib Lengths Measuring 175 Ft or Under; Pile Driver; Versi Lifts, Tri-Lifts & Gantrys (20,000 Lbs. & Over). Future Increase(s): Add \$1.60/hr on 6/2/2015; Add \$1.60/hr on 6/3/2016. Premium Increase(s): Add \$.25/hr for all >45 Ton lifting capacity cranes.	35.42	19.78	55.20
510	Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of Under 130,000 Lbs., Backhoe (Mini, 15,000 Lbs. & Under); Concrete Bump Cutter, Grinder, Planing or Grooving Machine; Concrete Laser/Screed; Concrete Paver (Slipform); Concrete Pump (Over 46 Meter), Concrete Conveyor (Rotec or Bidwell Type); Concrete Slipform Placer Curb & Gutter Machine; Concrete Spreader & Distributor; Dredge (NOT Performing Work on the Great Lakes); Forklift (Machinery Moving or Steel Erection, 25 Ft & Over); Gradall (Cruz-Aire Type); Hydro-Blaster (10,000 PSI or Over); Milling Machine; Skid Rig; Traveling Crane (Bridge Type). Future Increase(s): Add \$1.60/hr on 6/2/2015; Add \$1.60/hr on 6/3/2016.	34.22	19.78	54.00



<b>Fringe Benefits Must Be Paid On <u>All</u> Hours Worked</b>		<b>HOURLY BASIC RATE OF PAY</b>	<b>HOURLY FRINGE BENEFITS</b>	<b>TOTAL</b>
<b>CODE</b>	<b>TRADE OR OCCUPATION</b>	<b>\$</b>	<b>\$</b>	<b>\$</b>
511	Air, Track, Rotary or Percussion Drilling Machine &/or Hammers, Blaster; Bulldozer or Endloader (Over 40 hp); Compactor (Self-Propelled 85 Ft Total Drum Width & Over, or Tractor Mounted, Towed & Light Equipment); Concrete Pump (46 Meter & Under), Concrete Conveyor (Rotec or Bidwell Type); Crane (Carry Deck, Mini) or Truck Mounted Hydraulic Crane (10 Tons or Under); Environmental Burner; Gantrys (Under 20,000 Lbs.); Grader or Motor Patrol; High Pressure Utility Locating Machine (Daylighting Machine); Manhoist; Material or Stack Hoist; Mechanic or Welder; Railroad Track Rail Leveling Machine, Tie Placer, Extractor, Tamper, Stone Leveler or Rehabilitation Equipment; Roller (Over 5 Ton); Scraper (Self Propelled or Tractor Drawn) 5 cu yd or More Capacity; Screed (Milling Machine); Sideboom; Straddle Carrier or Travel Lift; Tining or Curing Machine; Tractor (Scraper, Dozer, Pusher, Loader); Tractor or Truck Mounted Hydraulic Backhoe; Tractor or Truck Mounted Hydraulic Crane (10 Tons or Under); Trencher (Wheel Type or Chain Type Having Over 8-Inch Bucket). Future Increase(s): Add \$1.60/hr on 6/2/2015; Add \$1.60/hr on 6/3/2016.	33.69	19.78	53.47
512	Backfiller; Broom or Sweeper; Bulldozer or Endloader (Under 40 hp); Compactor (Self-Propelled 84 Ft Total Drum Width & Under, or Tractor Mounted, Towed & Light Equipment); Concrete Batch Plant, Batch Hopper; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Concrete Conveyor System; Concrete Finishing Machine (Road Type); Fireman (Pile Driver & Derrick NOT Performing Work on the Great Lakes); Grout Pump; Hoist (Tugger, Automatic); Industrial Locomotives; Jeep Digger; Lift Slab Machine; Mulcher; Roller (Rubber Tire, 5 Ton or Under); Screw or Gypsum Pumps; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); Stump Chipper; Trencher (Wheel Type or Chain Type Having 8-Inch Bucket & Under); Winches & A-Frames. Future Increase(s): Add \$1.60/hr on 6/2/2015; Add \$1.60/hr on 6/3/2016.	31.62	19.78	51.40
513	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Augers (Vertical & Horizontal); Boatmen (NOT Performing Work on the Great Lakes); Boiler (Temporary Heat); Crusher, Screening or Wash Plant; Elevator; Farm or Industrial Type Tractor; Fireman (Asphalt Plant NOT Performing Work on the Great Lakes); Forklift; Generator (&/or 150 KW or Over); Greaser; Heaters (Mechanical); Loading Machine (Conveyor); Oilier; Post Hole Digger or Driver; Prestress Machine; Pump (3 Inch or Over) or Well Points; Refrigeration Plant or Freeze Machine; Robotic Tool Carrier (With or Without Attachments); Rock, Stone Breaker; Skid Steer Loader (With or Without Attachments); Vibratory Hammer or Extractor, Power Pack. Future Increase(s): Add \$1.60/hr on 6/2/2015; Add \$1.60/hr on 6/3/2016.	30.99	19.78	50.77
514	Gas or Utility Pipeline, Except Sewer & Water (Primary Equipment). Future Increase(s): Add \$1/hr on 6/1/2015; Add \$1/hr on 5/30/2016.	36.34	22.14	58.48
515	Gas or Utility Pipeline, Except Sewer & Water (Secondary Equipment). Future Increase(s): Add \$1.65/hr on 6/1/2015.	33.12	19.35	52.47
516	Fiber Optic Cable Equipment	28.89	17.95	46.84



The documents following the Prevailing Wage Rate Determination consist of eighteen pages (including this one) of various forms/documents that will be used throughout the completion of the project. The chart below lists the form number, form/document name, the party who uses the document, and the document's number of pages. If you have any questions regarding these forms please call the Prevailing Wage Office at (608)266-6861.

ERD Form Number	Form Name	Party Who Uses the Form	Pages
	Prevailing Wage - Public Entity Project Owners	Explanation of project owner responsibilities	2
16056	Post the White Sheet	Contracting agency	1
10908	Consolidated List of Debarred Contractors	Any party contracting someone to complete work on a prevailing wage project	3
	Prevailing Wage – Contractors	Explanation of contractor responsibilities	2
7777	Disclosure of Ownership	Contractors that meet the criteria set out in (3)(A)&(B) of the form	1
5724	Prime Contractor Affidavit of Compliance	Prime contractor files with contracting agency upon completion of the work before receiving final payment	2
10584	Agent or Subcontractor Affidavit of Compliance	Subcontractors file with their awarding contractor upon completion of their work on the project before receiving final payment	2
10880	Request to Employ Subjourneyperson	Contractors wishing to employ a subjourneyperson(s)	1
	Additional General Prevailing Wage Law Information	General information for public entity or any other interested party	3

10/01/2014

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## PREVAILING WAGE – Public Entity Project Owners

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

### Thresholds

- A “single-trade project of public works” means a project in which a single trade accounts for 85% or more of the total labor cost of the project. The single trade threshold is \$48,000.
- A “multiple-trade project of public works” means a project in which no single trade accounts for 85% or more of the total labor cost of the project.
- (a) The multiple-trade threshold is \$100,000, unless a municipality falls under the description in (b).
  - (b) The multiple-trade threshold of \$234,000 applies to public works projects erected, constructed, repaired, remodeled, or demolished by a private contractor for •a city or village with a population less than 2500 or •a town.

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

- Request a prevailing wage rate determination for the project from DWD at least 30 days before soliciting bids or negotiating contracts. An Application for Prevailing Wage Rate Determination is available on the DWD website: [http://dwd.wisconsin.gov/er/prevailing\\_wage\\_rate/default.htm](http://dwd.wisconsin.gov/er/prevailing_wage_rate/default.htm)  
To avoid waiting for a project determination use the on-line application system that permits the user to generate a determination immediately and save all documents in PDF form to the user’s computer. Use this project determination on line application at the following address:

- Tell potential contractors the project is subject to state prevailing wage law when soliciting bids.
- Include the prevailing wage rate determination in the construction contract, or if there is no written contract, provide a copy of the project determination to each prime contractor.
- Award contracts to contractors who do *not* appear on the "Consolidated List of Debarred Contractors."
- Notify contractors that they are required to have a written substance abuse testing program in place that fulfills the requirements of §103.503, Wis. Stats., before commencing work on the prevailing wage project.
- Post the prevailing wage rate determination on the project site. (This document is often referred to as "the white sheet.")
- Notify project contractors that if DWD finds that a contractor violated the prevailing wage law, DWD will assess liquidated damages of 100% of the wages owed to employees.
- Obtain an Affidavit of Compliance from each prime contractor before making final payment for the project.

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

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

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

## **POST THE WHITE SHEET**

As the public entity receiving this prevailing wage rate determination, YOU ARE REQUIRED by law to post the prevailing wage rate determination (i.e., white sheet) in at least one conspicuous and easily accessible place on the project site that is available to all construction workers. The white sheet must remain posted from the onset of the project until all construction labor on the project has been completed.

[See, Wis. Admin. Code §DWD 290.12(1)]

Posting the white sheet inside the general contractor's trailer does not meet this requirement. That placement is not available/accessible to all workers and is not a location over which you have control.

If you have questions about posting, please call (608)266-6861 and ask for prevailing wage intake.

State of Wisconsin - Department of Workforce Development

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

<u>Name of Contractor</u>	<u>Address</u>	<u>Effective Date</u>	<u>Termination Date</u>	<u>Cause Code</u>	<u>Date of Violation(s)</u>	<u>Limitations/Deviations</u>
A-1 Duran Roofing & Insulation Services, Inc.	3700 N Fratney St Milwaukee, WI 53212 or 8095 NW 64 <sup>th</sup> St Miami, FL 33166	11/1/14	10/31/17	1, 2 and 4	2011- 2012	None
Abel, Mike	See, Abel Electric, Inc					
Abel Electric, Inc	3385 Belmar Rd Green Bay, WI 54313	9/1/12	8/31/15	1	2011	None
Arnie Christiansen Mason Contractors, LLC	2304 65 <sup>th</sup> Dr Franksville, WI 53126	9/1/14	8/31/16	1, 2 and 4	2011	None
Atkins, Scott	See, Freedom Insulation, Inc					
Boecker, Roger	See, R-Way Pumping, Inc					
Brechtl, Mark G	See, Ecodec, Inc					
Cargill Heating and Air Conditioning Company, Inc	3049 Edgewater La La Crosse, WI 54603	3/1/14	2/28/17	1 and 2	2011	None
Castlerock Commercial Construction, Inc	PO Box 11699 Milwaukee, WI 53211-0699	2/1/12	1/31/15	1, 2 and 4	2009 & 2010	None

<u>Name of Contractor</u>	<u>Address</u>	<u>Effective Date</u>	<u>Termination Date</u>	<u>Cause Code</u>	<u>Date of Violation(s)</u>	<u>Limitations/ Deviations</u>
Christiansen, Andy	See, Annie Christiansen Mason Contractors, LLC					
Christiansen, Arnold	See, Annie Christiansen Mason Contractors, LLC					
Darnick, Gregory L	See, Darnick Trucking, LLC					
Darnick Trucking, LLC	W914 County Rd V Berlin, WI 54923	11/1/14	10/31/15	1, 2 and 4	2012 & 2013	None
Dem/Ex Group, Inc	805 S Adams St Manito, IL 61546	12/1/11	11/30/14	1 and 2	2010	None
Duran, Bernardo	See, A-1 Duran Roofing & Insulation Services and RRS2 Inc					
Ecodec, Inc	5106 Wintergreen Dr Madison, WI 53704	10/1/14	9/30/17	1	2011 & 2012	None
Fisher, Ed &/or Fisher, Rhonda	See, Dem/Ex Group, Inc					
Freedom Insulation, Inc	117925 219th Ave Chippewa Falls, WI 54729	9/1/11	8/31/14	1	2008- 2010	None
Galstad, Michael E (aka Michael Earl Galstad)	See, Cargill Heating and Air Conditioning Company, Inc					
Gjolaj, Ded	See, Horizon Bros Painting Corp					
Horizon Bros Painting Corp	1053 Kendra La Howell, MI 48843	10/1/14	9/30/16	4	2012	None
JT Roofing, Inc	350 Tower Dr Saukville, WI 53080	6/1/12	5/31/15	1, 2 and 4	2007 & 2008	None



<u>Name of Contractor</u>	<u>Address</u>	<u>Effective Date</u>	<u>Termination Date</u>	<u>Cause Code</u>	<u>Date of Violation(s)</u>	<u>Limitations/ Deviations</u>
Jinkins, Richard	See, Castlerock Commercial Construction, Inc					
Oden, Cassie	See, A-1 Duran Roofing & Insulation Services and RRS2 Inc					
Ofstie, Darin	See, Precision Excavating and Grading, LLC					
Peret, Robert	See, A-1 Duran Roofing & Insulation Services and RRS2 Inc					
Precision Excavating and Grading, LLC or Precision Excavating Enterprises, LLC	2104 Pierce Saint Croix Rd Baldwin, WI 54002	5/1/11	4/30/14	1, 2 and 4	2006- 2008	None
R-Way Pumping, Inc	3023 Lake Maria Rd Freeport, MN 56331	3/1/12	2/28/15	1, 2 and 4	2008	None
RRS2 Inc	133 N Jackson St, #427 Milwaukee, WI 53202 or 1313 N Franklin Pl, #805 Milwaukee, WI 53202	11/1/14	10/31/17	1, 2 and 4	2011- 2012	None
Thull, Gerald T	See, JT Roofing, Inc					

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

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## PREVAILING WAGE – Contractors

Any public works project that has a total estimated project cost that equals or exceeds prevailing wage project thresholds requires a prevailing wage rate determination issued by the Department of Workforce Development (DWD). Public works include erecting, constructing, remodeling, repairing, demolishing, alterations, painting and decorating projects for a local governmental unit or state agency. State law excludes minor service or maintenance work, warranty work, or work under a supply-and-installation contract. There is a statutory definition for most of these exclusions. The prevailing wage laws that apply to local governmental units and their contractors are §§66.0903 and 103.503, Wis. Stats. The prevailing wage laws that apply to state agencies and their contractors are §§103.49 and 103.503, Wis. Stats. The applicable administrative rules for all prevailing wage projects are DWD 290 and DWD 294, Wis. Adm. Code. These laws include provisions that apply to all contractors and subcontractors working on prevailing wage projects.

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

- Receive and review the project's prevailing wage rate determination (i.e., white sheet).
- Tell subcontractors the project is subject to state prevailing wage law and include the prevailing wage rate determination in the construction contract, or if there is no written contract, provide a copy of the project determination to each subcontractor.
- Hire subcontractors who do *not* appear on the "Consolidated List of Debarred Contractors."
- Have a written substance abuse testing program in place that fulfills the requirements of §103.503, Wis. Stats., before commencing work on the project.

- Notify subcontractors that if DWD finds that a contractor or subcontractor violated the prevailing wage law, DWD will assess liquidated damages of 100% of the wages owed to employees.
- Apply to DWD for subjourney wage rates prior to employing these individuals on the project.
- Receive and retain a completed Affidavit of Compliance from each subcontractor brought on to the project before providing final payment to those subcontractors.
- Submit a completed Affidavit of Compliance to the contractor who brought the subcontractor on to the project before receiving final payment for the project.
- Maintain payroll records for 3 years that comply with §§66.0903(10)(a) or 103.49(5)(a), Stats. and DWD 274.06.
- Respond to requests from DWD or the project owner to provide payroll records and/or respond to prevailing wage complaints filed by employees or third parties.

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

## Disclosure of Ownership

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

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

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

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

### Other Construction Business

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

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

Print the Name of Authorized Officer

Authorized Officer Signature

Date Signed

Corporation, Partnership or Sole Proprietorship Name

Street Address or P O Box

City

State

Zip Code

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

## Prime Contractor Affidavit of Compliance With Prevailing Wage Rate Determination

Authorization for this form is provided under Sections 66.0903(9)(c), 66.0904(7)(c) and 103.49(4r)(c) Wisconsin Statutes.

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

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

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

State Of )  )SS	Project Name		
	DWD Determination Number	Project Number (if applicable)	
	Date Determination Issued	Date of Contract	
County Of )	Awarding Agency		
	Date Work Completed		

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

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

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

## List of Agents and Subcontractors

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

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

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

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

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

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

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

## Agent or Subcontractor Affidavit of Compliance With Prevailing Wage Rate Determination

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

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

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

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

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

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

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

## List of Agents and Subcontractors

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

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

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

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

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

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

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



## Request to Employ Subjourneyperson

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

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

1. Name of Project Appearing on the Project Determination

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

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

Requester Signature

Date Signed

MAIL the completed request to:  
EQUAL RIGHTS DIVISION, LABOR STANDARDS BUREAU  
PO BOX 8928, MADISON WI 53708

OR

FAX the completed request to: (608) 267-4592 / **DO NOT e-mail your request.**  
Call (608) 266-6861 for assistance in completing this form.

## ADDITIONAL GENERAL PREVAILING WAGE LAW INFORMATION

(This document updated February 2014)

For prevailing wage laws and frequently asked questions, refer to the prevailing wage website at:  
[http://dwd.wisconsin.gov/er/prevailing\\_wage\\_rate/default.htm](http://dwd.wisconsin.gov/er/prevailing_wage_rate/default.htm)

Topic	Who's affected?	Brief description of requirement under §66.0903 or §103.49
Non-applicability	All public entities	Prevailing wage rates do not apply to minor service or maintenance work, warranty work, or work under a supply and installation contract.
Non-applicability: Minor service or maintenance work	Local governmental units & Contractors	Minor service or maintenance work means a project of public works that is limited to <ul style="list-style-type: none"> <li>• minor crack filling, chip or slurry sealing, or other minor pavement patching, not including overlays, that has a projected life span of no longer than 5 years or that is performed for a TOWN and is not funded under §86.31, regardless of projected life span;</li> <li>• the depositing of gravel on an existing gravel road applied solely to maintain the road;</li> <li>• road shoulder maintenance;</li> <li>• cleaning of drainage or sewer ditches or structures; or</li> <li>• any other limited, minor work on public facilities or equipment that is routinely performed to prevent breakdown or deterioration.</li> </ul>
Non-applicability: Minor service or maintenance work	State agencies	Minor service or maintenance work means a project of public works that is limited to <ul style="list-style-type: none"> <li>• minor crack filling, chip or slurry sealing, or other minor pavement patching, not including overlays, that has a projected life span of no longer than 5 years;</li> <li>• cleaning of drainage or sewer ditches or structures; or</li> <li>• any other limited, minor work on public facilities or equipment that is routinely performed to prevent breakdown or deterioration.</li> </ul>
Non-applicability: Supply & installation contract	All public entities	Supply and installation contract means a contract under which the material is installed by means of simple fasteners or connectors such as screws or nuts and bolts and no other work is performed on the site of the project of public works, and the total labor cost to install the material does not exceed 20 percent of the total cost of the contract.
Non-applicability: Work which a contractor or individual donates to a public entity	All public entities	Prevailing wage laws §§66.0903 & 103.49, Stats., do not apply to work performed on a project of public works for which the local governmental unit or the state or the state agency contracting for the project is not required to compensate any contractor, subcontractor, contractor's or subcontractor's agent, or individual for performing the work.

Topic	Who's affected?	Brief description of requirement under §66.0903 or §103.49
Non-applicability: Residential	All public entities	A prevailing wage rate determination is not required for the erection, construction, repair, remodeling, or demolition of a residential property containing 2 dwelling units or less.
Non-applicability: Residential subdivision infrastructure	All public entities	A prevailing wage rate determination is not required for a road, street, bridge, sanitary sewer, or water main project that is a part of a development in which at least 90 percent of the lots contain or will contain 2 dwelling units or less, as determined by the local governmental unit at the time of approval of the development, and that, on completion, is acquired by, or dedicated to, a local governmental unit (including under §236.13(2), Stats.), or the state, for ownership or maintenance by the local governmental unit or the state.
Electronic certified payroll record	Contractors	The requirement that every contractor on a prevailing wage project submit to DWD monthly a certified record of employees who worked on the project and that DWD post these certified records on its Internet website was discontinued effective July 1, 2011. Contractors are still required to maintain payroll records and provide them upon request from DWD &/or the project owner.
Payroll record inspection request by any person	Contractors & Complainants	Any person may request DWD to inspect the payroll records of any contractor working on a prevailing wage project. On receipt of such a request, the contractor must submit to DWD a certified record of its payroll records, other than personally identifiable information relating to an employee of the contractor, for no longer than a 4-week period. DWD may request records from a contractor under this provision no more than once per calendar quarter for each project of public works on which the contractor is performing work. The department may not charge a requester a fee for obtaining that information. DWD must make these certified records available for public inspection.
Statewide uniformity	Local governmental units	A local governmental unit may not enact & administer a prevailing wage ordinance/provision for public works or publicly funded private construction projects. Any extant laws to that effect are void.
Substance Abuse Testing	Contractors & Workers	Before commencing work on a prevailing wage project, a contractor must have a written substance abuse testing program in place that complies with §103.503, Wis. Stats. No employee may use, possess, attempt to possess, distribute, deliver, or be under the influence of a drug or under the influence of alcohol while performing work on a prevailing wage project.

Topic	Who's affected	Brief description of requirement under §66.0903 or §103.49
Covered employees	Truck drivers & Other workers & Contractors	<p>A laborer, worker, mechanic, or truck driver who is employed to process, manufacture, pick up, or deliver materials or products from a commercial establishment that has a fixed place of business from which the establishment supplies processed or manufactured materials or products or from a facility that is not dedicated exclusively, or nearly so, to a project of public works is NOT entitled to receive the prevailing wage rate UNLESS any of the following applies:</p> <ol style="list-style-type: none"><li>1) the laborer, worker, mechanic, or truck driver is employed to go to the source of mineral aggregate such as sand, gravel, or stone and deliver that mineral aggregate to the site of a project of public works by depositing the material directly in final place, from the transporting vehicle or through spreaders from the transporting vehicle.</li><li>2) the laborer, worker, mechanic, or truck driver is employed to go to the site of a project of public works, pick up excavated material or spoil from the site of the project, and transport that excavated material or spoil away from the site of the project.</li></ol>

## SCHEDULE OF ITEMS

REVISED:

CONTRACT:  
20150512011PROJECT(S):  
5640-02-81FEDERAL ID(S):  
N/A

CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS

## SECTION 0001 Contract Items

0010	204.0110 Removing Asphaltic Surface	SY	417.000	.	.
0020	204.0155 Removing Concrete Sidewalk	SY	200.000	.	.
0030	204.0225 Removing Septic Tanks	EACH	2.000	.	.
0040	204.0235 Removing Buildings (parcel) 01. Restroom Facility	LUMP	LUMP	.	.
0050	205.0100 Excavation Common	CY	305.000	.	.
0060	213.0100 Finishing Roadway (project) 01. 5640-02-81	EACH	1.000	.	.
0070	305.0110 Base Aggregate Dense 3/4-Inch	TON	67.000	.	.
0080	305.0120 Base Aggregate Dense 1 1/4-Inch	TON	285.000	.	.
0090	465.0105 Asphaltic Surface	TON	88.000	.	.
0100	602.0410 Concrete Sidewalk 5-Inch	SF	1,790.000	.	.

## SCHEDULE OF ITEMS

REVISED:

CONTRACT:  
20150512011PROJECT(S):  
5640-02-81FEDERAL ID(S):  
N/A

CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0110	602.0505 Curb Ramp Detectable Warning Field Yellow	16.000 SF	.		.	
0120	618.0100 Maintenance And Repair of Haul Roads (project) 01. 5640-02-81	1.000 EACH	.		.	
0130	619.1000 Mobilization	1.000 EACH	.		.	
0140	625.0500 Salvaged Topsoil	2,800.000 SY	.		.	
0150	627.0200 Mulching	1,710.000 SY	.		.	
0160	628.1504 Silt Fence	790.000 LF	.		.	
0170	628.1520 Silt Fence Maintenance	790.000 LF	.		.	
0180	628.1905 Mobilizations Erosion Control	2.000 EACH	.		.	
0190	628.1910 Mobilizations Emergency Erosion Control	1.000 EACH	.		.	
0200	628.7560 Tracking Pads	1.000 EACH	.		.	
0210	629.0210 Fertilizer Type B	1.100 CWT	.		.	

## SCHEDULE OF ITEMS

REVISED:

CONTRACT:  
20150512011PROJECT(S):  
5640-02-81FEDERAL ID(S):  
N/A

CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0220	630.0130 Seeding Mixture No. 30	31.000 LB	.		.	
0230	631.0300 Sod Water	38.000 MGAL	.		.	
0240	631.1000 Sod Lawn	1,700.000 SY	.		.	
0250	634.0612 Posts Wood 4x6-Inch X 12-FT	2.000 EACH	.		.	
0260	637.2210 Signs Type II Reflective H	2.000 SF	.		.	
0270	638.2602 Removing Signs Type II	2.000 EACH	.		.	
0280	639.0110 Drill Hole in Earth 10-Inch	175.000 LF	.		.	
0290	639.1006 Well Casing Pipe 6-Inch	175.000 LF	.		.	
0300	639.1700 Well Screen	3.000 LF	.		.	
0310	639.2100 Grout for Sealing Well Casing	62.000 CF	.		.	
0320	639.4000 Test Pumping	2.000 EACH	.		.	

## SCHEDULE OF ITEMS

REVISED:

CONTRACT:  
20150512011PROJECT(S):  
5640-02-81FEDERAL ID(S):  
N/A

CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0330	642.5001 Field Office Type B	1.000 EACH	.		.	
0340	643.0100 Traffic Control (project) 01. 5640-02-81	1.000 EACH	.		.	
0350	650.4500 Construction Staking Subgrade	400.000 LF	.		.	
0360	650.5000 Construction Staking Base	400.000 LF	.		.	
0370	652.0220 Conduit Rigid Nonmetallic Schedule 40 1 1/2-Inch	180.000 LF	.		.	
0380	655.0615 Electrical Wire Lighting 10 AWG	720.000 LF	.		.	
0390	690.0150 Sawing Asphalt	44.000 LF	.		.	
0400	SPV.0090 Special 01. Temporary Fence	555.000 LF	.		.	
0410	SPV.0090 Special 02. Remove Curb Head	17.000 LF	.		.	
0420	SPV.0105 Special 01. Restroom Facility Building	LUMP	LUMP		.	
0430	SPV.0105 Special 02. Restroom Facility Plumbing	LUMP	LUMP		.	



## SCHEDULE OF ITEMS

REVISED:

CONTRACT:  
20150512011PROJECT(S):  
5640-02-81FEDERAL ID(S):  
N/A

CONTRACTOR : \_\_\_\_\_

LINE NO	ITEM DESCRIPTION	APPROX. QUANTITY AND UNITS	UNIT PRICE		BID AMOUNT	
			DOLLARS	CTS	DOLLARS	CTS
0440	SPV.0105 Special 03. Restroom Facility (HVAC) Ventilation	LUMP	LUMP			.
0450	SPV.0105 Special 04. Restroom Facility Electrical	LUMP	LUMP			.
0460	SPV.0105 Special 05. Septic System	LUMP	LUMP			.
0470	SPV.0105 Special 06. Miscellaneous Well Items	LUMP	LUMP			.
0480	SPV.0105 Special 07. Salvage and Reinstall Existing Kiosk	LUMP	LUMP			.
0490	SPV.0105 Special 08. Construction Staking Site Layout	LUMP	LUMP			.
	SECTION 0001 TOTAL					.
	TOTAL BID					.



**PLEASE ATTACH SCHEDULE OF ITEMS HERE**