

Contract Routing Form

printed on: 07/02/2013

ROUTING: Routine

Contract between: Monona Plumbing & Fire Protection, Inc.
 and Dept. or Division: Engineering Division
 Name/Phone Number: *Pete Halmgren, 261-5530*
 Project: Upgrade Booster Pumps At Unit Well 20

Contract No.: 7045
 Enactment No.: *RES-13-00477*
 Dollar Amount: *274,920.00*

File No.: 30353
 Enactment Date: 06/19/2013

(Please DATE before routing)

Signatures Required	Date Received	Date Signed
City Clerk	<i>7-3-13</i>	<i>7-3-13</i>
Director of Civil Rights	<i>7-5-13</i>	<i>7/12/13 WJD</i>
Risk Manager	<i>7/12/13</i>	<i>7/12/13 KRB</i>
Finance Director	<i>7-15-13</i>	<i>7-15-13 fm</i>
City Attorney <i>#1003</i>	<i>7-16-2013</i>	<i>7-18-2013</i>
Mayor	<i>7-18-13</i>	<i>7-19-13</i>

Please return signed Contracts to the City Clerk's Office
 Room 103, City-County Building for filing.

Original + 2 Copies

PO# 8153 7045

Dis Rights: *OK* / N/A / Problem - Hold
 Prev Wage: *AA* / Agency / No
 Contract Value: *See above*
 AA Plan: *Approved*
 Amendment / Addendum # _____
 Type: POS / Dwp / Sbdv / Gov't /
 Grant / *PW* / Goal / Loan / Agrmt

1000

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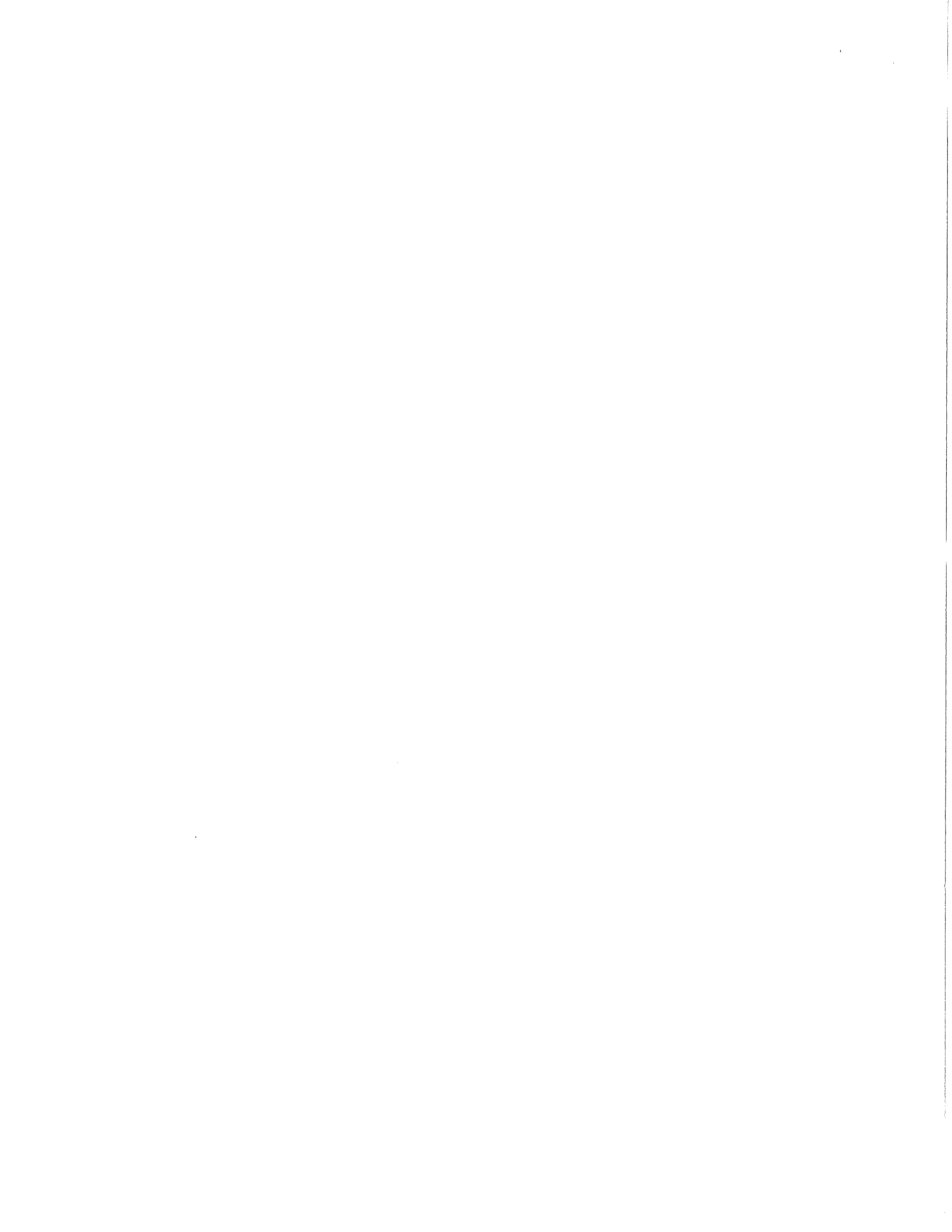
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File #: 30353 **Version:** 1 **Name:** Awarding Public Works Contract No. 7045, Upgrading Booster Pumps at Unit Well 20.
Type: Resolution **Status:** Passed
File created: 5/24/2013 **In control:** BOARD OF PUBLIC WORKS
On agenda: 6/18/2013 **Final action:** 6/18/2013
Enactment date: 6/19/2013 **Enactment #:** RES-13-00477
Title: Awarding Public Works Contract No. 7045, Upgrading Booster Pumps at Unit Well 20.
Sponsors: BOARD OF PUBLIC WORKS
Attachments: 1. Contract 7045.pdf

[History \(2\)](#)
 [Text](#)

2 records		Group	Export			
Date	Ver.	Action By	Action	Result	Action Details	Watch
6/18/2013	1	<u>COMMON COUNCIL</u>			Not available	Not available
6/5/2013	1	<u>BOARD OF PUBLIC WORKS</u>			Not available	Not available



PROJECT _____ CONTRACTOR _____ AMOUNT OF BID _____

CONTRACT NO. 7045
UPGRADING BOOSTER PUMPS AT UNIT WELL 20

MONONA PLUMBING & FIRE PROTECTION

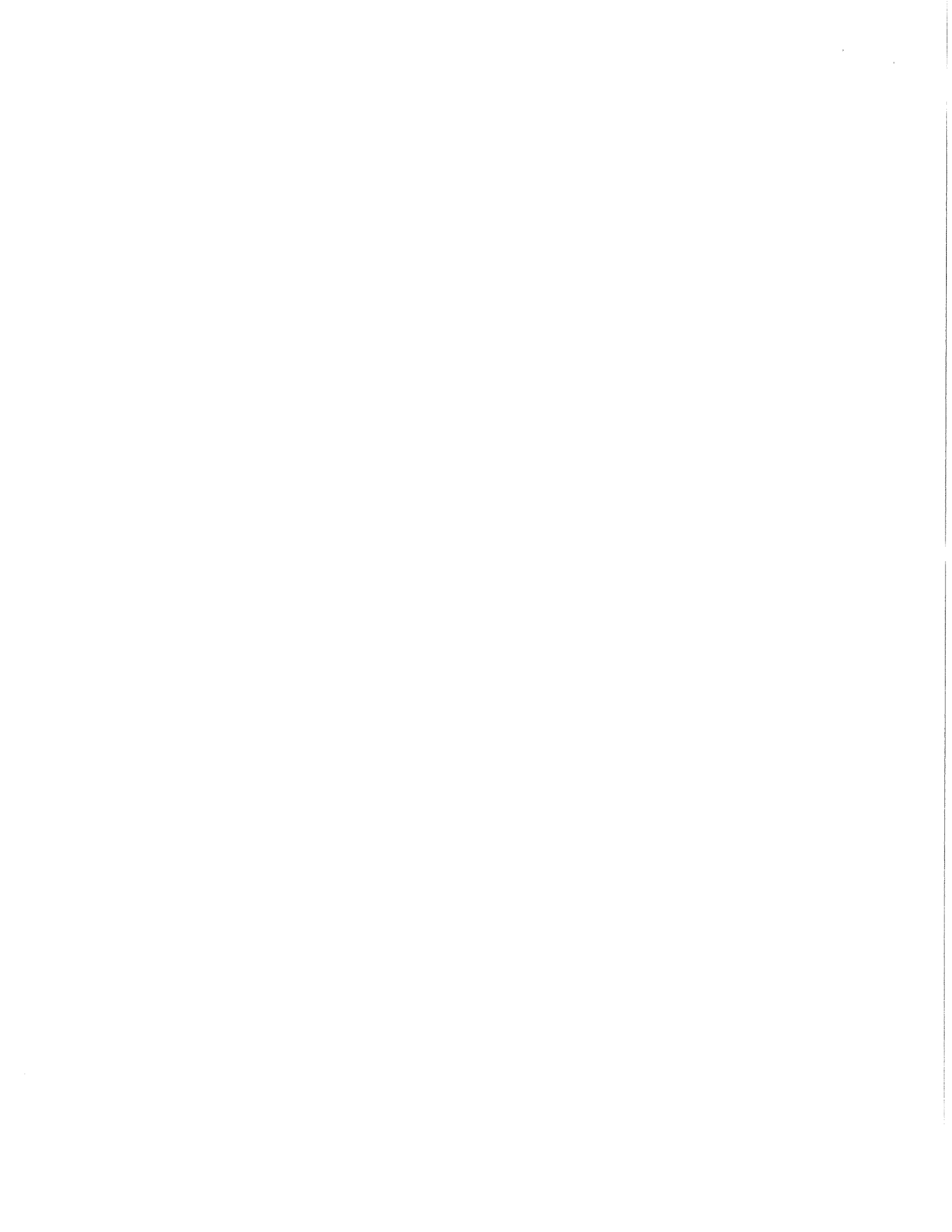
\$274,920.00

Acct. No. EW01-58599-810458
Contingency 8%±

\$274,920.00
21,990.00

GRAND TOTAL

\$296,910.00



\$274,920.00
FILE

BID OF MONONA PLUMBING & FIRE PROTECTION, INC.

2013

PROPOSAL, CONTRACT, BOND AND SPECIFICATIONS

FOR

UPGRADE BOOSTER PUMPS AT UNIT WELL 20

CONTRACT NO. 7045

IN

MADISON, DANE COUNTY, WISCONSIN

AWARDED BY THE COMMON COUNCIL
MADISON, WISCONSIN ON JUNE 18, 2013

CITY ENGINEERING DIVISION
1600 EMIL STREET MADISON,
WISCONSIN 53713

www.cityofmadison.com/business/pw

<https://bidexpress.com/login>




**UPGRADE BOOSTER PUMPS AT UNIT WELL 20
CONTRACT NO. 7045**

INDEX

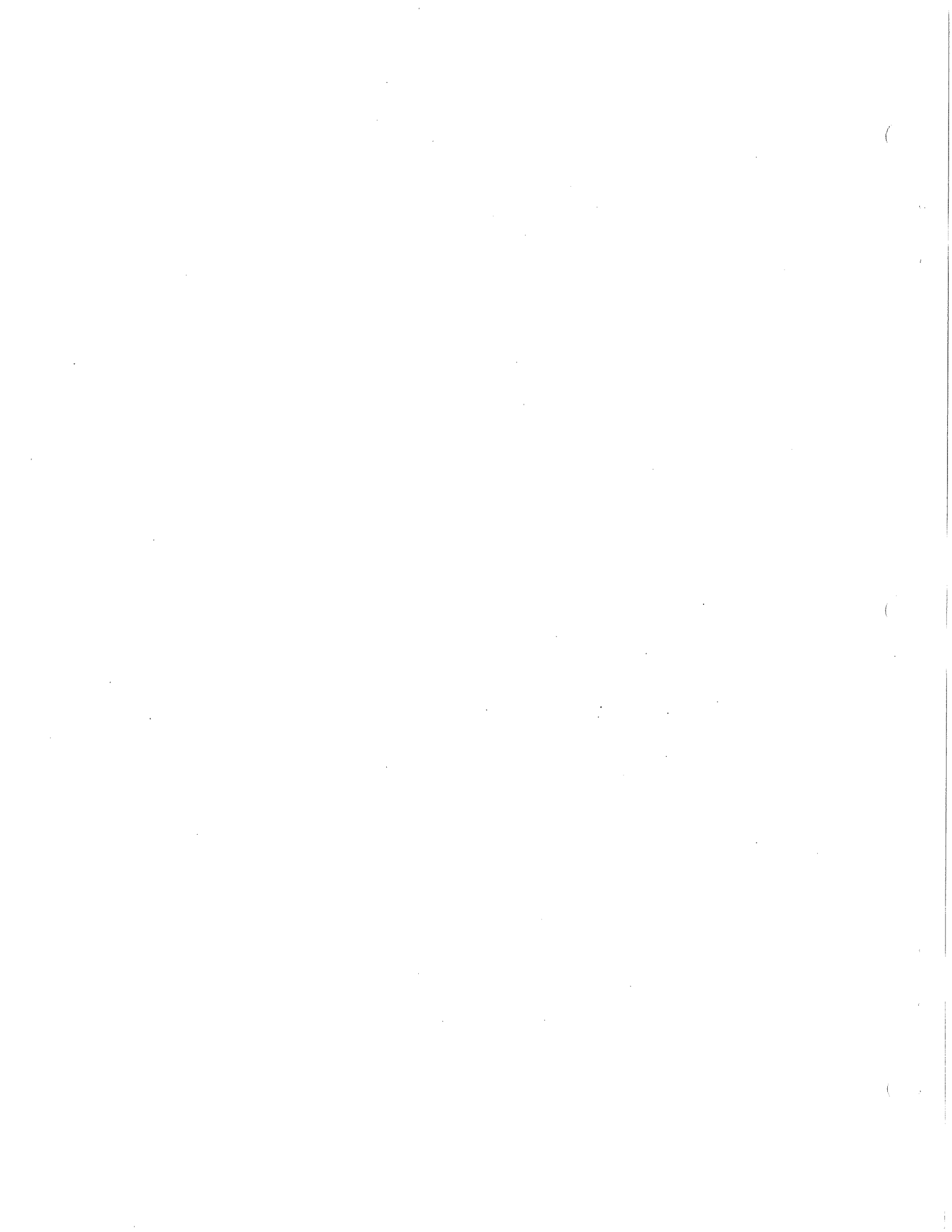
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This Proposal, and Agreement have
been prepared by:

**CITY ENGINEERING DIVISION
CITY OF MADISON
MADISON, DANE COUNTY, WISCONSIN**


Alan Larson, P.E., Principal Engineer

9/17/13



SECTION A: ADVERTISEMENT FOR BIDS AND INSTRUCTIONS TO BIDDERS

REQUEST FOR BID FOR PUBLIC WORKS CONSTRUCTION CITY OF MADISON, WISCONSIN

A BEST VALUE CONTRACTING MUNICIPALITY

PROJECT NAME:	UPGRADE BOOSTER PUMPS AT UNIT WELL 20
CONTRACT NO.:	7045
SBE GOAL	3%
BID BOND	5%
PRE BID MEETING (1:00 P.M.)	May 17, 2013
PREQUALIFICATION APPLICATION DUE (1:00 P.M.)	May 17, 2013
BID SUBMISSION (1:00 P.M.)	May 24, 2013
BID OPEN (1:30 P.M.)	May 24, 2013
PUBLISHED IN WSJ	April 19, 2013 & April 26, 2013

PRE BID MEETING: Representatives of the Affirmative Action Department will be present to discuss the Small Business Enterprise requirements at 1600 Emil Street, Madison Wisconsin.

PREQUALIFICATION APPLICATION: Forms are available on our website, www.cityofmadison.com/business/pw/forms.cfm. If not currently prequalified in the categories listed in Section A, an amendment to your Prequalification will need to be submitted prior to the same due date. Postmark is not applicable.

BIDS TO BE SUBMITTED by hand to 1600 EMIL ST., MADISON, WI 53713 or online at www.bidexpress.com.

THE BID OPENING is at 1600 EMIL ST., MADISON, WI 53713.

Plans and Specifications are also available at 1600 Emil St., Madison, WI, 53713; (608) 267-1197.

STANDARD SPECIFICATIONS

The City of Madison's Standard Specifications for Public Works Construction - 2013 Edition, as supplemented and amended from time to time, forms a part of these contract documents as if attached hereto.

These standard specifications are available on the City of Madison Public Works website, www.cityofmadison.com/Business/PW/specs.cfm.

The Contractor shall review these Specifications prior to preparation of proposals for the work to be done under this contract, with specific attention to Article 102, "BIDDING REQUIREMENTS AND CONDITIONS" and Article 103, "AWARD AND EXECUTION OF THE CONTRACT." For the convenience of the bidder, below are highlights of three subsections of the specifications.

SECTION 102.1: PRE-QUALIFICATION OF BIDDERS

In accordance with Wisconsin State Statutes 66.0901 (2) and (3), all bidders must submit to the Board of Public Works proof of responsibility on forms furnished by the City. The City requires that all bidders be qualified on a biennial basis.

Bidders must present satisfactory evidence that they have been regularly engaged in the type of work specified herein and they are fully prepared with necessary capital, materials, machinery and supervisory personnel to conduct the work to be contracted for to the satisfaction of the City. All bidders must be pre-qualified by the Board of Public Works for the type of construction on which they are bidding prior to the opening of the bid.

In accordance with Section 39.02(9)(a).l. of the General Ordinances, all bidders shall submit in writing to the Affirmative Action Division Manager of the City of Madison, a Certificate of Compliance or an Affirmative Action Plan at the same time or prior to the submission of the proof of responsibility forms.

The bidder shall be disqualified if the bidder fails to or refuses to, prior to opening of the bid, submit a Certificate of compliance, Affirmative Action Plan or Affirmative Action Data Update, as applicable, as defined by Section 39.02 of the General Ordinances (entitled Affirmative Action) and as required by Section 102.11 of the Standard Specifications.

SECTION 102.4 PROPOSAL

No bid will be accepted that does not contain an adequate or reasonable price for each and every item named in the Schedule of Unit Prices.

A lump sum bid for the work in accordance with the plans and specifications is required. The lump sum bid must be the same as the total amounts bid for the various items and it shall be inserted in the space provided.

All papers bound with or attached to the proposal form are considered a part thereof and must not be detached or altered when the proposal is submitted. The plans, specifications and other documents designated in the proposal form will be considered a part of the proposal whether attached or not.

A proposal submitted by an individual shall be signed by the bidder or by a duly authorized agent. A proposal submitted by a partnership shall be signed by a member/partner or by a duly authorized agent thereof. A proposal submitted by a corporation shall be signed by an authorized officer or duly authorized registered agent of such corporation, and the proposal shall show the name of the State under the laws of which such corporation was chartered. The required signatures shall in all cases appear in the space provided thereof on the proposal.

Each proposal shall be placed, together with the proposal guaranty, in a sealed envelope, so marked as to indicate name of project, the contract number or option to which it applies, and the name and address of the Contractor or submitted electronically through Bid Express (www.bidexpress.com). Proposals will be accepted at the location, the time and the date designated in the advertisement. Proposals received after the time and date designated will be returned to the bidder unopened.

The Bidder shall execute the Disclosure of Ownership form. REFER TO SECTION F.

SECTION 102.5: BID DEPOSIT (PROPOSAL GUARANTY)

All bids, sealed or electronic, must be accompanied with a Bid Bond equal to at least 5% of the bid or a Certificate of Annual/Biennial Bid Bond or certified check, payable to the City Treasurer. Bid deposit of the successful bidders shall be returned within forty-eight (48) hours following execution of the contract and bond as required.

PREVAILING WAGE RATES

Prevailing Wage Rates may be required and are attached in Section J of the contract. See Special Provisions to determine applicability.

Bidders for this Contract(s) must be Pre-Qualified for at least one of the following type(s) of construction denoted by an

Building Demolition

- 101 Asbestos Removal
- 120 House Mover

- 110 Building Demolition

Street, Utility and Site Construction

- 201 Asphalt Paving
- 205 Blasting
- 210 Boring/Pipe Jacking
- 215 Concrete Paving
- 220 Con. Sidewalk/Curb & Gutter/Misc. Flat Work
- 221 Concrete Bases and Other Concrete Work
- 225 Dredging
- 230 Fencing
- 235 Fiber Optic Cable/Conduit Installation
- 240 Grading and Earthwork
- 241 Horizontal Saw Cutting of Sidewalk
- 242 Infrared Seamless Patching
- 245 Landscaping, Maintenance
- 250 Landscaping, Site and Street
- 251 Parking Ramp Maintenance
- 255 Pavement Sealcoating and Crack Sealing
- 260 Petroleum Above/Below Ground Storank Tank Removal/Install
- 265 Retaining Walls, Precast Modular Units
- 270 Retaining Walls, Reinforced Concrete
- 275 Sanitary, Storm Sewer and Water Main Construction

- 280 Sewer Lateral Drain Cleaning/Internal TV Insp.
- 285 Sewer Lining
- 290 Sewer Pipe Bursting
- 295 Soil Borings
- 300 Soil Nailing
- 305 Storm & Sanitary Sewer Laterals & Water Svc.
- 310 Street Construction
- 315 Street Lighting
- 318 Tennis Court Resurfacing
- 320 Traffic Signals
- 325 Traffic Signing & Marking

- 332 Tree pruning/removal
- 333 Tree, pesticide treatment of
- 335 Trucking

- 340 Utility Transmission Lines including Natural Gas, Electrical & Communications

- 399 Other _____

Bridge Construction

- 501 Bridge Construction and/or Repair

Building Construction

- 401 Floor Covering (including carpet, ceramic tile installation, rubber, VCT)
- 402 Building Automation Systems
- 403 Concrete
- 404 Doors and Windows
- 405 Electrical - Power, Lighting & Communications
- 410 Elevator - Lifts
- 412 Fire Suppression
- 413 Furnishings - Furniture and Window Treatments
- 415 General Building Construction, Equal or Less than \$250,000
- 420 General Building Construction, \$250,000 to \$1,500,000
- 425 General Building Construction, Over \$1,500,000
- 428 Glass and/or Glazing
- 429 Hazardous Material Removal
- 430 Heating, Ventilating and Air Conditioning (HVAC)
- 433 Insulation - Thermal

- 435 Masonry/Tuck pointing
- 437 Metals
- 440 Painting and Wallcovering
- 445 Plumbing
- 450 Pump Repair
- 455 Pump Systems
- 460 Roofing and Moisture Protection
- 461 Solar Photovoltaic/Hot Water Systems
- 465 Soil/Groundwater Remediation
- 466 Warning Sirens
- 470 Water Supply Elevated Tanks
- 475 Water Supply Wells
- 480 Wood, Plastics & Composites - Structural & Architectural
- 499 Other _____

State of Wisconsin Certifications

- 1 Class 5 Blaster - Blasting Operations and Activities 2500 feet and closer to inhabited buildings for quarries, open pits and road cuts.
- 2 Class 6 Blaster - Blasting Operations and Activities 2500 feet and closer to inhabited buildings for trenches, site excavations, basements, underwater demolition, underground excavations, or structures 15 feet or less in height.
- 3 Class 7 Blaster - Blasting Operations and Activities for structures greater than 15' in height, bridges, towers, and any of the objects or purposes listed as "Class 5 Blaster or Class 6 Blaster".
- 4 Petroleum Above/Below Ground Storage Tank Removal and Installation (Attach copies of State Certifications.)
- 5 Hazardous Material Removal (Contractor to be certified for asbestos and lead abatement per the Wisconsin Department of Health Services, Asbestos and Lead Section (A&LS).) See the following link for application: www.dhs.wisconsin.gov/Asbestos/Cert. State of Wisconsin Performance of Asbestos Abatement Certificate must be attached.
- 6 Certification number as a Certified Arborist or Certified Tree Worker as administered by the International Society of Arboriculture
- 7 Pesticide application (Certification for Commercial Applicator For Hire with the certification in the category of turf and landscape (3.0) and possess a current license issued by the DATCP)
- 8 Other _____
- 9 Other _____

(2)

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SECTION B: PROPOSAL

Please refer to the
Bid Express Website
at <https://bidexpress.com>
look up contract number
and go to
Section B: Proposal Page
(If bidding electronically)

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SECTION C: SMALL BUSINESS ENTERPRISE

Instructions to Bidders City of Madison SBE Program Information

2 Small Business Enterprise (SBE) Program Information

2.1 Policy and Goal

The City of Madison reaffirms its policy of nondiscrimination in the conduct of City business by maintaining a procurement process which remains open to all who have the potential and ability to sell goods and services to the City. It is the policy of the City of Madison to allow Small Business Enterprises (SBE) maximum feasible opportunity to participate in City of Madison contracting. The bidder acknowledges that its bid has been submitted in accordance with the SBE program and is for the public's protection and welfare.

Please refer to the "ADVERTISEMENT FOR BIDS" for the goal for the utilization of SBEs on this project. SBEs may participate as subcontractors, vendors and/or suppliers, which provide a commercially useful function. The dollar value for SBE suppliers or 'materials only' vendors shall be discounted to 60% for purposes of meeting SBE goals.

A bidder which achieves or exceeds the SBE goal will be in compliance with the SBE requirements of this project. In the event that the bidder is unable to achieve the SBE goal, the bidder must demonstrate that a good faith effort to do so was made. Failure to either achieve the goal or demonstrate a good faith effort to do so will be grounds for the bidder being deemed a non-responsible contractor ineligible for award of this contract.

A bidder may count towards its attainment of the SBE goal only those expenditures to SBEs that perform a commercially useful function. For purposes of evaluating a bidder's responsiveness to the attainment of the SBE goal, the contract participation by an SBE is based on the percentage of the total base bid proposed by the Contractor. The total base bid price is inclusive of all addenda.

Work performed by an SBE firm in a particular transaction can be counted toward the goal only if it involves a commercially useful function. That is, in light of industry practices and other relevant considerations, does the SBE firm have a necessary and useful role in the transaction, of a kind for which there is a market outside the context of the SBE Program, or is the firm's role a superfluous step added in an attempt to obtain credit towards goals? If, in the judgment of the Affirmative Action Division, the SBE firm will not perform a commercially useful function in the transaction, no credit towards goals will be awarded.

The question of whether a firm is performing a commercially useful function is completely separate from the question of whether the firm is an eligible SBE. A firm is eligible if it meets the definitional criteria and ownership and control requirements, as set forth in the City of Madison's SBE Program.

If the City of Madison determines that the SBE firm is performing a commercially useful function, then the City of Madison must then decide what that function is. If the commercially useful function is that of an SBE vendor / supplier that regularly transacts business with the respective product, then the City of Madison will count 60% of the value of the product supplied toward SBE goals.

To be counted, the SBE vendor / supplier must be engaged in selling the product in question to the public. This is important in distinguishing an SBE vendor / supplier, which has a regular trade with a variety of customers, from a firm which performs supplier-like functions on an ad hoc basis or for only one or two contractors with whom it has a special relationship.

A supplier of bulk goods may qualify as an eligible SBE vendor / supplier if it either maintains an inventory or owns or operates distribution equipment. With respect to the distribution equipment; e.g., a fleet of trucks, the term "operates" is intended to cover a situation in which the supplier leases the equipment on a regular basis for its entire business. It is not intended to cover a situation in which the firm simply provides drivers for trucks owned or leased by another party; e.g., a prime contractor, or leases such a party's trucks on an ad hoc basis for a specific job.

If the commercially useful function being performed is not that of a qualified SBE vendor / supplier, but rather that of delivery of products, obtaining bonding or insurance, procurement of personnel, acting as a broker or manufacturer's representative in the procurement of supplies, facilities, or materials, etc., only the fees or commissions will apply towards the goal.

For example, a business that simply transfers title of a product from manufacturer to ultimate purchaser; e. g., a sales representative who re-invoices a steel product from the steel company to the Contractor, or a firm that puts a product into a container for delivery would not be considered a qualified SBE vendor / supplier. The Contractor would not receive credit based on a percentage of the cost of the product for working with such firms.

Concerning the use of services that help the Contractor obtain needed supplies, personnel, materials or equipment to perform a contract: only the fee received by the service provider will be counted toward the goal. For example, use of a SBE sales representative or distributor for a steel company, if performing a commercially useful function at all, would entitle the Contractor receiving the steel to count only the fee paid to the representative or distributor toward the goal. This provision would also govern fees for professional and other services obtained expressly and solely to perform work relating to a specific contract.

Concerning transportation or delivery services: if an SBE trucking company picks up a product from a manufacturer or a qualified vendor / supplier and delivers the product to the Contractor, the commercially useful function it is performing is not that of a supplier, but simply that of a transporter of goods. Unless the trucking company is itself the manufacturer or a qualified vendor / supplier in the product, credit cannot be given based on a percentage of the cost of the product. Rather, credit would be allowed for the cost of the transportation service.

The City is aware that the rule's language does not explicitly mention every kind of business that may contribute work on this project. In administering these programs, the City would, on a case-by-case basis, determine the appropriate counting formula to apply in a particular situation.

2.2 Contract Compliance

Questions concerning the SBE Program shall be directed to the Contract Compliance Officer of the City of Madison Department of Civil Rights, Affirmative Action Division, 210 Martin Luther King, Jr. Blvd., Room 523, Madison, WI 53703; telephone (608) 266-4910.

2.3 Certification of SBE by City of Madison

The Affirmative Action Division maintains a directory of SBEs which are currently certified as such by the City of Madison. Contact the Contract Compliance Officer as indicated in Section 2.2 to receive a copy of the SBE Directory or you may access the SBE Directory online at www.cityofmadison.com/dcr/aaTBDDir.cfm.

All contractors, subcontractors, vendors and suppliers seeking SBE status must complete and submit the **Targeted Business Certification Application** to the City of Madison Affirmative Action Division by the time and date established for receipt of bids. A copy of the Targeted Business Certification Application is available by contacting the Contract Compliance Officer at the address and telephone indicated in Section 2.2 or you may access the Targeted Business Certification Application online at www.cityofmadison.com/dcr/aaTBDDir.cfm. Submittal of the Targeted Business Certification Application by the time specified does not guarantee that the applicant will be certified as a SBE eligible to be utilized towards meeting the SBE goal for this project.

2.4 Small Business Enterprise Compliance Report

2.4.1 Good Faith Efforts

Bidders shall take all necessary affirmative steps to assure that SBEs are utilized when possible and that the established SBE goal for this project is achieved. A contractor who self performs a portion of the work, and is pre-qualified to perform that category of work, may subcontract that portion of the work, but shall not be required to do so. When a bidder is unable to achieve the established SBE goal, the bidder must demonstrate that a good faith effort to do so was made. Such a good faith effort should include the following:

- 2.4.1.1 Attendance at the pre-bid meeting.
- 2.4.1.2 Using the City of Madison's directory of certified SBEs to identify SBEs from which to solicit bids.
- 2.4.1.3 Assuring that SBEs are solicited whenever they are potential sources.
- 2.4.1.4 Referring prospective SBEs to the City of Madison Affirmative Action Division for certification.
- 2.4.1.5 Dividing total project requirements into smaller tasks and/or quantities, where economically feasible, to permit maximum feasible SBE participation.
- 2.4.1.6 Establishing delivery schedules, where requirements permit, which will encourage participation by SBEs.
- 2.4.1.7 Providing SBEs with specific information regarding the work to be performed.
- 2.4.1.8 Contacting SBEs in advance of the deadline to allow such businesses sufficient time to prepare a bid.
- 2.4.1.9 Utilizing the bid of a qualified and competent SBE when the bid of such a business is deemed reasonable (i.e. 5% above the lowest bidder), although not necessarily low.
- 2.4.1.10 Contacting SBEs which submit a bid, to inquire about the details of the bid and confirm that the scope of the work was interpreted as intended.

2.4.2 Reporting SBE Utilization and Good Faith Efforts

The Small Business Enterprise Compliance Report is to be submitted by the bidder with the bid: This report is due by the specified bid closing time and date. Bids submitted without a completed SBE Compliance Report as outlined below

shall be deemed non-responsible and the bidder ineligible for award of this contract.

2.4.2.1 If the Bidder meets or exceeds the goal established for SBE utilization, the Small Business Enterprise Compliance Report shall consist of the following:

2.4.2.1.1 **Cover Page, Page C-7; and**

2.4.2.1.2 **Summary Sheet, C-8.**

2.4.2.2 If the bidder does not meet the goal established for SBE utilization, the Small Business Enterprise Compliance Report shall consist of the following:

2.4.2.2.1 **Cover Page, Page C-7;**

2.4.2.2.2 **Summary Sheet, C-8; and**

2.4.2.2.3 **SBE Contact Report, C-9 and C-10. (A separate Contact Report must be completed for each applicable SBE which is not utilized.)**

2.5 Appeal Procedure

A bidder which does not achieve the established goal and is deemed non-responsible for failure to demonstrate a good faith effort to achieve such goal and subsequently denied eligibility for award of contract may, within 72 hours of receiving such notification, appeal that decision to a special appeals committee composed of three (3) members of the Affirmative Action Commission, three (3) members of the Board of Public Works and a seventh member appointed by the Mayor. All appeals must be made in writing to the City Engineer and received within 72 hours of City of Madison's notice. Postmark not applicable.

2.6 SBE Requirements After Award of the Contract

The successful bidder shall identify SBE subcontractors, suppliers and vendors on the subcontractor list in accordance with the specifications. The Contractor shall submit a detailed explanation of any variances between the listing of SBE subcontractors, vendors and/or suppliers on the subcontractor list and the Contractor's SBE Compliance Report for SBE participation.

No change in SBE subcontractors, vendors and/or suppliers from those SBEs indicated in the SBE Compliance Report will be allowed without prior approval from the Engineer and the Affirmative Action Division. The contractor shall submit in writing to the City of Madison Affirmative Action Division a request to change any SBE citing specific reasons which necessitate such a change. The Affirmative Action Division will use a general test of reasonableness in approving or rejecting the contractor's request for change. If the request is approved, the Contractor will make every effort to utilize another SBE if available.

The City will monitor the project to ensure that the actual percentage commitment to SBE firms is carried out.

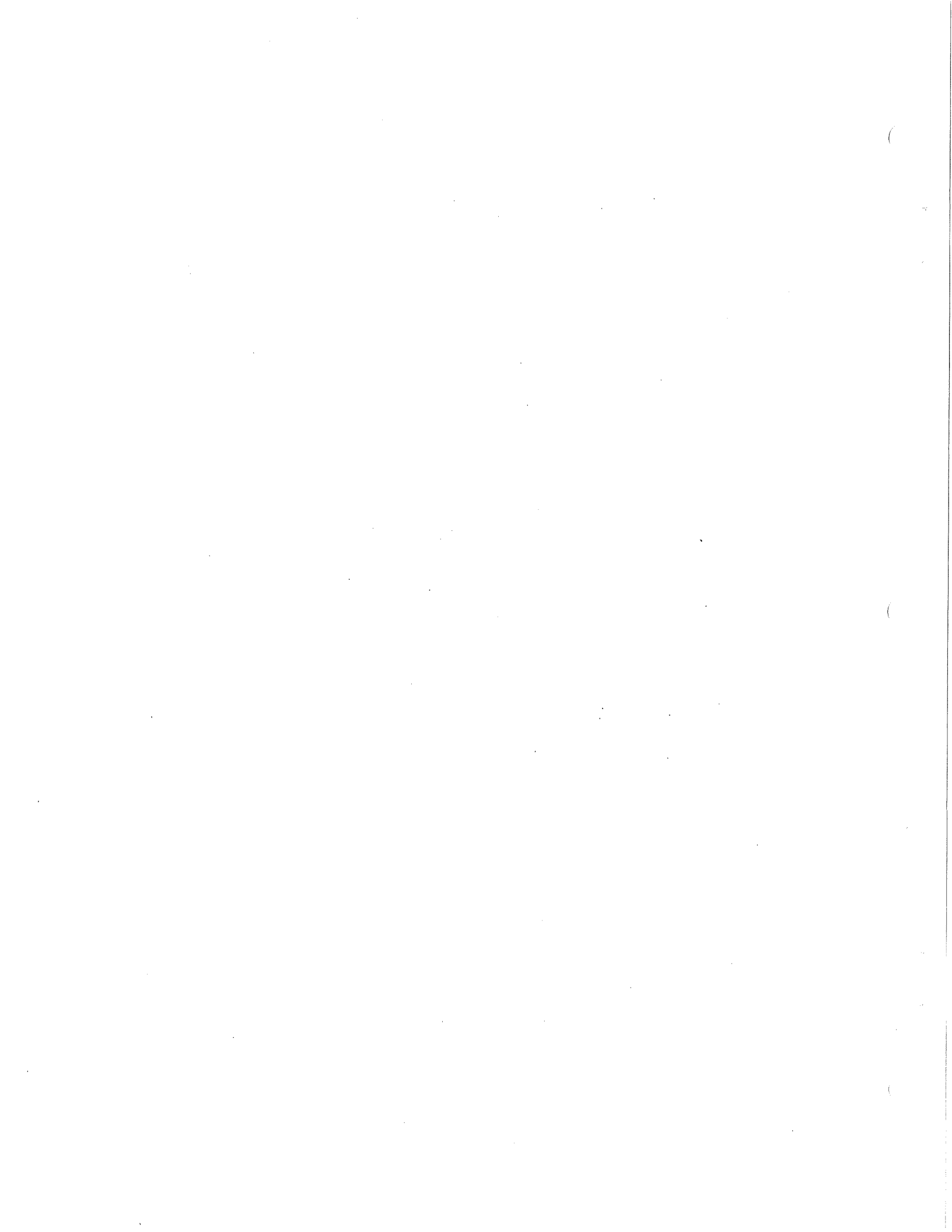
2.7 SBE Definition and Eligibility Guidelines

A Small Business Enterprise is a business concern awarded certification by the City of Madison. For the purposes of this program a Small Business Enterprise is defined as:

- A. An independent business operated under a single management. The business may not be a subsidiary of any other business and the stock or ownership may not be held by any individual or any business operating in the same or a similar field. In determining whether an entity qualifies as a SBE, the City shall consider all factors relevant to being an independent business including, but not limited to, the date the business was established, adequacy of its resources for the work in which it proposes to involve itself, the degree to which financial, equipment leasing and other relationships exist with other ineligible firms in the same or similar lines of work. SBE owner(s) shall enjoy the customary incidents of ownership and shall share in the risks and profits commensurate with their enjoyment interests, as demonstrated by an examination of the substance rather than form or arrangements that may be reflected in its ownership documents.
- B. A business that has averaged no more than \$4.0 million in annual gross receipts over the prior three year period and the principal owner(s) do not have a personal net worth in excess of \$1.32 million.

Firm and/or individuals that submit fraudulent documents/testimony may be barred from doing business with the City and/or forfeit existing contracts.

SBE certification is valid for one (1) year unless revoked.



**UPGRADE BOOSTER PUMPS AT UNIT WELL 20
CONTRACT NO. 7045**

Small Business Enterprise Compliance Report

**This information may be submitted electronically through
Bid Express or submitted with bid in sealed envelope.**

Cover Sheet

Prime Bidder Information

Company: _____

Address: _____

Telephone Number: _____ Fax Number: _____

Contact Person/Title: _____

Prime Bidder Certification

I, _____, _____ of
Name Title

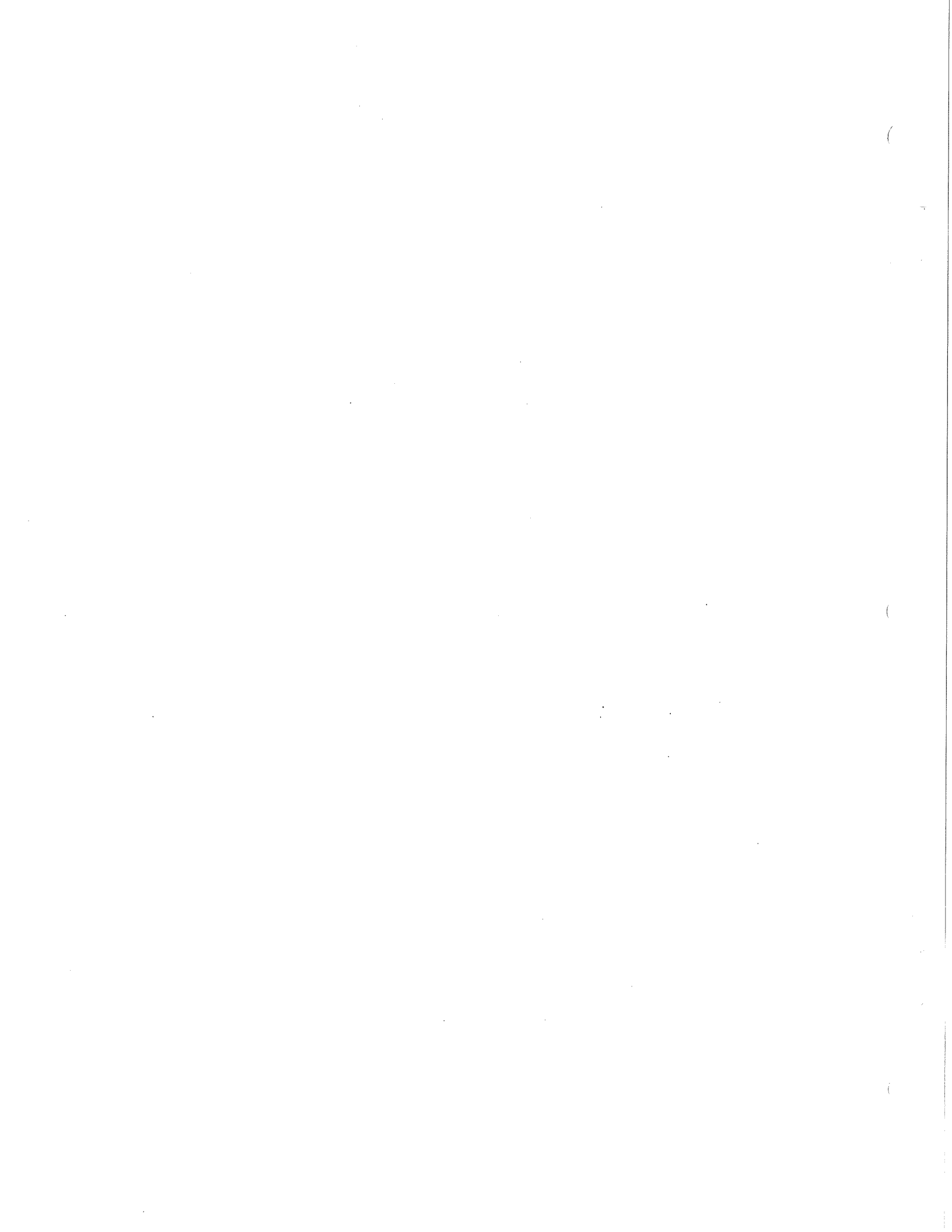
_____ certify that the information
Company

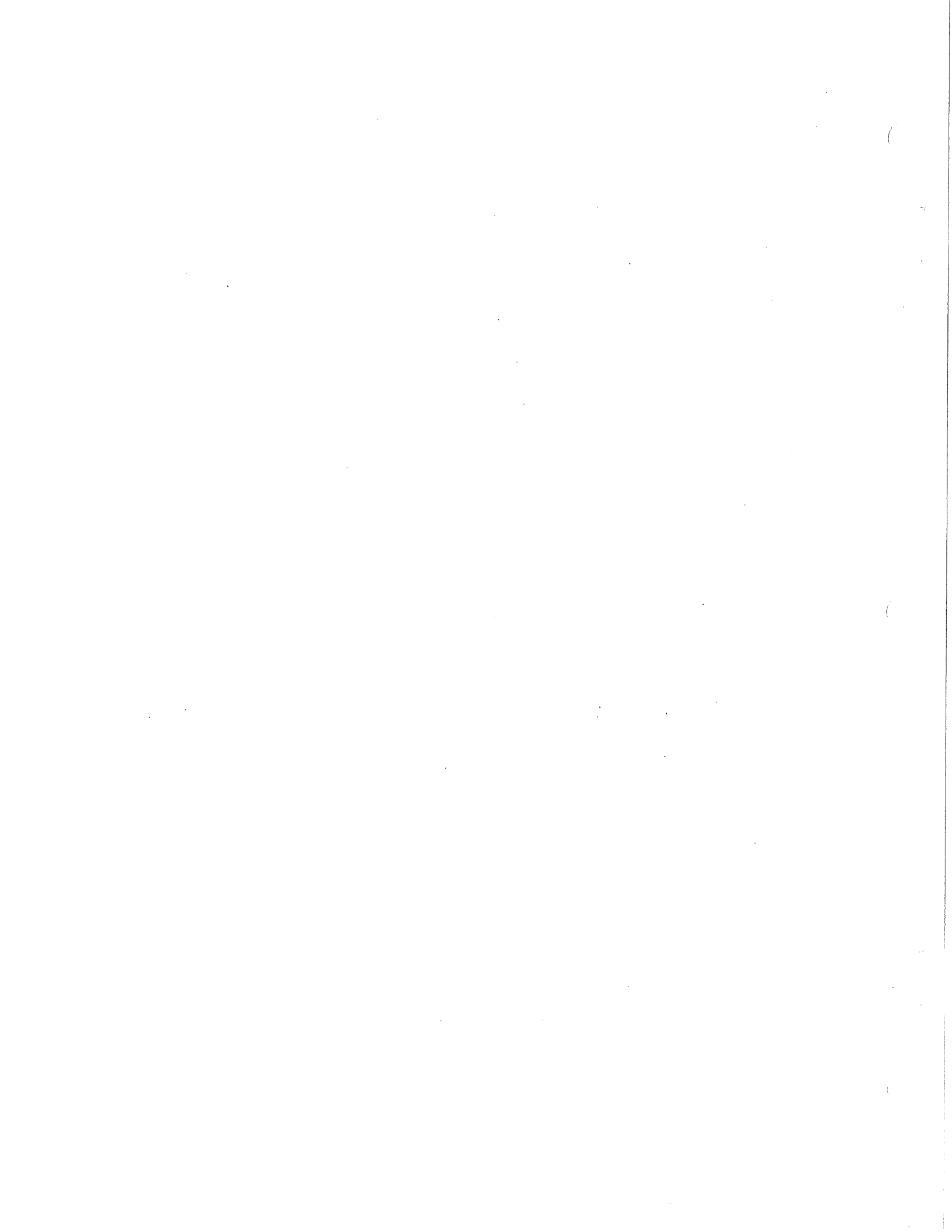
contained in this SBE Compliance Report is true and correct to the best of my knowledge and belief.

Witness' Signature

Bidder's Signature

Date





**UPGRADE BOOSTER PUMPS AT UNIT WELL 20
CONTRACT NO. 7045**

Small Business Enterprise Compliance Report

SBE Contact Report

Submit separate copy of this form for each SBE which you are not able to utilize towards meeting the SBE goal for this project. Attach separate sheets if necessary.

SBE Information

Company: _____

Address: _____

Telephone Number: _____

Contact Person/Title: _____

1. Outline below all efforts to solicit a bid from the above SBE. Include date, means of contact, who from your company made this contact and the result.

2. Describe the information provided to the aforementioned SBE regarding the scope of work for which he/she was to provide a bid.

Is this the same scope of work on which the subcontractor you intend to utilize based his/her bid?

Yes No

3. Did this SBE submit a bid? Yes No

4. Is the General Contractor pre-qualified to self-perform this category of work?

Yes No

5. If you responded "Yes" to Question 3, please check the items below which apply and provide the requested detail. If you responded "No" to Question 3, please skip ahead to item 6 below.

The SBE listed above is unavailable for work on this project for the following reasons. Provide specific detail for this conclusion.

The SBE listed above is unqualified for work on this project. Provide specific details for this conclusion.

The SBE listed above provided a price that was unreasonable (i.e. more than 5% above the lowest bidder). Provide specific detail for this conclusion including the SBE's price and the price of the subcontractor you intend to utilize.

A contract with the SBE listed above may constitute a breach of the bidder's collective bargaining agreements. Provide specific detail for this conclusion including, but not limited to, correspondence from the SBE indicating it will not sign a project labor agreement and/or correspondence from the applicable trade union indicating a project labor agreement will not be allowed at the time of project bidding.

Other; please specify reason(s) other than listed above which made it impossible for you to utilize this SBE on this project.

6. Describe any other good faith efforts:

SECTION D: SPECIAL PROVISIONS

UPGRADE BOOSTER PUMPS AT UNIT WELL 20 CONTRACT NO. 7045

It is the intent of these Special Provisions to set forth the final contractual intent as to the matter involved and shall prevail over the Standard Specifications and plans whenever in conflict therewith. In order that comparisons between the Special Provisions can be readily made, the numbering system for the Special Provisions is equivalent to that of the Specifications.

Whenever in these Specifications the term "Standard Specifications" appears, it shall be taken to refer to the City of Madison Standard Specifications for Public Works Construction and Supplements thereto.

SECTION 102.10: MINIMUM RATE OF WAGE SCALE

For this project, payment of prevailing wages (white sheet) is not required if either: a single trade accounts for 85% or more of the total labor costs of the project and the bid is less than \$48,000; or no single trade accounts for 85% or more of the total labor costs of the project and the bid is less than \$100,000. For bids not meeting either of these conditions, prevailing wages shall be required.

If required, the wages and benefits paid on the contract shall not be less than those specified in the Prevailing Wage Determination included with these contract documents for the following types of work:

- Building and Heavy Construction
- Sewer, Water, and Tunnel Construction
- Local Street and Miscellaneous Paving Operations
- Residential and Agricultural Construction

All bidders are notified that all labor employed on City contracts must be paid in accordance with the minimum rate of wage scale included in the Contract Documents.

For the information of the employees working on the project, a copy of the wage scale included in the contract documents and the provisions of Section 66.0903(8) of the Wisconsin Statutes shall be kept posted by the employer and in at least one conspicuous and easily accessible place at the site of the project.

The Contractor shall keep weekly payroll records setting forth the name, address, telephone number, classification, wage rate and fringe benefit package of each employee who worked on such City project and all other projects the employee worked in the same period, and the Contractor must keep records of the individual time each employee worked on the project and for each day of the project. Records shall include employee demographics or contractor can submit a one-time report of all employee demographics that can be matched up with weekly payrolls. Reports shall only include last four social security digits. Such records shall also set forth the total number of hours of overtime credited to each such employee for each day and week and the amount of overtime pay received in that week. Such records shall, in addition, set forth the full weekly wages earned by each such employee and the actual hourly wage paid to that employee. The Contractor shall submit payroll records to the Engineer every week for those periods when work is being done on the project. Said submittal shall be within twenty-one (21) calendar days of the end of the Contractor's weekly pay period.

The Contractor shall ensure that employees shall be paid unconditionally and shall receive the full amounts accrued at the time of payment, computed at rates not less than those stated in the City of Madison "Minimum Rate of Wage Scale" and that each employee's rate shall be determined by the work that is done within the trade or occupation classification which should be properly assigned to such employee. Questions regarding an employee's classification or rate of pay within that classification, shall be resolved by the practice that predominates in the industry and on which the trade or occupation rate/classification is based. Therefore, rate of pay, classification and work jurisdiction disputes shall be

resolved by relying upon practices established by collective bargaining agreements and guidelines used in such determinations by appropriate recognized trade unions operating within the City of Madison.

The Contractor shall agree that the normal rate of wage paid to the Contractor's employees on other projects shall not be reduced or otherwise diminished as a result of the requirement to pay no less than the minimum rate of wage scale on a City project. Mulcting of employees on City projects by contractors, such as by kickbacks or other such devices, is prohibited.

These contract provisions shall apply to all work performed on the contract by the Contractor with its own organization and with assistance of laborers under its immediate superintendency and to all work performed by piecework or by subcontract. No laborer, worker, or mechanic shall be employed directly upon the site of the work except on a wage basis, but this shall not be construed to prohibit the rental of equipment from individuals.

In the event of a refusal by the Contractor to submit payroll records as required by the contract, the City of Madison shall have the option to cancel this contract and request the Surety to perform or to re-let the balance of the work for bids, and in that event, to charge the Contractor for any loss which the City may incur thereby.

SECTION 102.12: BEST VALUE CONTRACTING

This Contract shall be considered a Best Value Contract if the Contractor's bid is equal to or greater than \$53,000 for a single trade contract; or equal to or greater than \$257,500 for a multi-trade contract pursuant to MGO 33.07(7).

SECTION 105.1: AUTHORITY OF THE ENGINEER

The Engineer shall resolve all questions which arise as to the quality and acceptability of materials furnished, work performed, manner of performance, rate of progress of the work, interpretation of the plans and Specifications, acceptable fulfillment of the contract, compensation, and disputes and mutual rights between Contractors under the Specifications. The Engineer shall determine the amount and quantity of work performed and materials furnished.

All decisions of the Engineer shall, when so requested, be rendered in writing. They shall be final and conclusive in all matters unless within ten (10) days after such decision the Contractor applies in writing to the Board of Public Works for a review of such decision.

Any change proposed by a Contractor in SBE subcontractors, vendors or suppliers from those SBEs indicated on the SBE Compliance Report must be approved by the Engineer and the City's Manager of the Affirmative Action Division (hereafter, AAD). When requested, such decision shall be rendered in writing. Such decisions shall be final and conclusive in all matters unless within ten (10) days after such decision the Contractor or the affected SBE applies in writing to the Board of Public Works for a review of such decision.

In the event the Engineer and the AAD disagree over the proper decision to be made regarding an SBE, the Mayor shall appoint a third person to resolve the disagreement, within 30 days of appointment. The decision thus rendered may be reviewed by the Board of Public Works upon request of the Contractor or the affected SBE as set forth in Sections 105.1 and 105.2 of the City's standard specifications.

**MADISON WATER UTILITY
UNIT WELL 20 PUMP AND MCC
UPGRADES**

TECHNICAL SPECIFICATIONS

Baxter & Woodman; Inc.
Crystal Lake, IL
815.459.1260

Chicago, IL
312.578.0050

DeKalb, IL
815.787.3111

Grayslake, IL
847.223.5088

Itasca, IL
630.773.1870

Mokena, IL
708.478.2090

Plainfield, IL
815.609.7425

Burlington, WI
262.763.7834

Madison, WI
608.277.1230

PROJECT TITLE PAGE
00 01 01 (120851.40)

00 01 07

SEALS PAGE

Dated 4/17, 2013

1. Specifications of materials and labor required for the construction work shown on the Drawings are prepared by Baxter & Woodman, Inc., Consulting Engineers.
2. The Drawings which accompanies these Specifications are titled "Madison Water Utility Madison, Wisconsin, Unit Well 20 Pump and MCC Upgrades".
3. Copyright 2013 by Baxter & Woodman, Inc. All Rights Reserved. No part of these Specifications or the accompanying Drawings may be reproduced by any means, or otherwise reused without the prior written permission of Baxter & Woodman, Inc.



Gerald D. Groth

Project Engineer
License Expires 7/31/2014

**MADISON WATER UTILITY
UNIT WELL 20 PUMP AND MCC UPGRADES
TECHNICAL SPECIFICATIONS**

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SUPPLEMENTARY CONDITIONS

PART 1 - GENERAL

1.1 SUPPLEMENTARY CONDITIONS

- A. These Supplementary Conditions modify, change, delete from or add to the "Standard General Conditions of the Construction Contract" EJCDC No. C-700, 2007 edition, herein brought into the contract by reference. The EJCDC documents supplement the City of Madison General Conditions. Where any Article of the General Conditions is modified, or any Paragraph, Subparagraph, or Clause thereof is modified or deleted by these Supplementary Conditions, the unaltered provisions of that Article, Paragraph, Subparagraph, or Clause shall remain in effect.

The General Conditions also may be supplemented elsewhere in the Contract Documents by provisions located in, but not necessarily limited to Division 01 of the Specifications.

1.2 ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

- A. SC-1
1. The terms used in these Supplementary Conditions which are defined in the Standard General Conditions of the Construction Contract have the identical meaning assigned to them in said General Conditions.
- B. SC-(1.01A.17)
1. The term "Drawings" and the term "Plans" shall be considered synonymous whenever and wherever used in the Contract Documents.

1.3 ARTICLE 2 - PRELIMINARY MATTERS

- A. SC-2.01.B
1. Delete paragraph 2.01.B in its entirety and substitute the following:

2.01.B When Contractor delivers the executed Agreements to Owner, Contractor shall also deliver to Owner, with copies to each additional insured indicated in paragraphs 5.03 through 5.06, certificates of insurance which Contractor is required to purchase and maintain in accordance with paragraphs 5.03 and 5.04.
- B. SC-2.02
1. Delete paragraph 2.02 in its entirety and substitute the following:

2.02 "ENGINEER will provide an electronic copy of the Drawings and Project Manual to the Contractor at the Preconstruction Conference."

- C. SC-2.03
1. Under paragraph 2.03, delete the last sentence in its entirety.
- D. SC-2.05.A
1. Delete paragraph 2.05.A in its entirety.
- E. SC-2.05.A.1 through 2.05.A.3
1. Delete paragraphs 2.05.A.1 through 2.05.A.3 inclusive in their entirety.
- F. SC-2.06
1. Under paragraph 2.06, add "Owner" to the listing of preconstruction conference attendees.
2. Under paragraph 2.06, change "paragraph 2.05.A " to "paragraph 2.07".
- G. SC-2.07
1. Delete paragraph 2.07 in its entirety and substitute the following:

2.07 Prior to submission of the first Application for Payment, but no later than 30 calendar days after Contract Times commence, Contractor shall submit to Engineer for review and approval:

A. A progress schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

B. A schedule of Shop Drawings and Sample submittal which will list each required submittal and the times for submitting, reviewing, and processing such submittal;

C. A schedule of values for all of the Work which will include quantities and prices of items aggregating the Contract Price and will subdivide the Work into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work; and

D. A schedule of progress payments Contractor anticipates will be earned during the course of the Work.

No progress payment shall be made to Contractor until the schedules are submitted to and acceptable to Engineer as provided below. The progress schedule will be acceptable to Engineer as providing an orderly progression of the Work to completion within any specified Milestones and the Contract Times, but such acceptance will neither impose on Engineer responsibility for the sequencing, scheduling or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor. Contractor's schedule of Shop Drawing and Sample submissions will be acceptable to Engineer as providing a workable arrangement for reviewing and processing the required submittals. Contractor's schedule of values will be acceptable to Engineer as to form and substance.

1.4 ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS;
REFERENCE POINTS

- A. SC-4.01.A
 - 1. Under paragraph 4.01.A, third sentence, insert the words "and temporary construction easements shown on the Drawings" after the word "facilities".
- B. SC-4.02.A
 - 1. Under paragraph 4.02.A, change "The Supplementary Conditions" to "Section 00 31 32.11 Subsurface Drilling Information or Section 00 31 32.13 Subsurface Drilling and Sampling Information."
- C. SC-4.02.B
 - 1. Under paragraph 4.02.B, delete the second sentence "Such technical data is identified in the Supplementary Conditions".
- D. SC-4.05.A
 - 1. Under paragraph 4.05.A., delete first sentence and substitute the following:
 - A. Owner shall provide land surveys necessary to establish right-of-way, easements and property lines. Engineer will provide base lines, bench marks and reference points which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall provide all stakes, markers, labor and assistance required by Engineer.
 - 2. Under paragraph 4.05.A, last sentence, insert the words "and pay" between the words "responsible" and "for".

1.5 ARTICLE 5 - BONDS AND INSURANCE

- A. SC-5.02 through 5.10
 - 1. Delete paragraphs 5.02 through 5.10, inclusive in their entirety and substitute the following:
 - 5.02 Licensed Sureties and Insurers; Insurance Policies:
 - A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Contractor shall be obtained from surety or insurance companies that are fully licensed or authorized in the jurisdiction in which the Project is located.
 - 5.03 Certificates of Insurance and Endorsements to Insurance Policies:
 - A. In addition to delivering certificates of insurance in accordance with paragraph 2.01.B, Contractor shall also deliver to Owner, with copies to each additional insured, copies of all endorsements to the insurance policies which Contractor is required to purchase and maintain in accordance with paragraphs 5.04 and 5.06, within 90 calendar days after the Effective Date of the Agreement or prior to final payment, whichever comes first. Owner will withhold from the third, and subsequent progress payments due Contractor, pending the receipt of all required insurance

policy endorsements, an amount equal to 10 percent of the value of the completed work, in addition to any retainage required by paragraph 14.02.A.3. Certificate of Insurance and endorsements shall be fully completed, signed and delivered in accordance with the requirements of Article 5. Samples of Certificate of Insurance Form, and Additional Insureds endorsements, acceptable to Owner, are included in Sections 00 62 16, 00 62 16.13, 00 62 16.16 and 00 62 16.19.

5.04 Contractor's Liability Insurance:

- A. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and furnished and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance and furnishing of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed or furnished by Contractor, by any Subcontractor, or Supplier, by anyone directly or indirectly employed by any of them to perform or furnish any of the Work or by anyone for whose acts any of them may be liable:
1. Workers' Compensation - Workers' Compensation in accordance with the laws of the State, but not less than:
 - E.L. \$500,000 each accident.
 - E.L. \$500,000 each employee.
 - E.L. \$500,000 policy limit.
 2. General Liability
 - (a) Bodily Injury Liability and Property Damage Liability in an amount not less than \$1,000,000 each occurrence and per project aggregate of not less than \$2,000,000.
 - (b) Above to include Premises Operations, Blanket Contractual Liability, Products/Completed Operations, Independent Contractors, Broad Form Property Damage, Personal Injury and "X", "C", and "U" Exclusions deleted.
 3. Automobile Liability
 - (a) \$1,000,000 - Bodily Injury and Property Damage (Combined Single Limit).
 - (b) Coverage shall include hired and non-owned automobiles.
 4. Umbrella Liability - Umbrella Liability coverage in an amount not less than \$3,000,000. Such coverage shall include, but not be limited to, excess coverage for the Workers' Compensation, General Liability, and Automobile Liability policies.

The policies of insurance so required by this paragraph 5.04 to be purchased and maintained shall:

5. Be furnished by insurers with A. M. Best Company rating of at least A- (Excellent), and a financial size category of VIII or greater.
6. With respect to general liability insurance required by paragraph 5.04A, include as additional insured Owner, Engineer, and Engineer's Consultants, all of whom shall be listed on such policy by name as additional insureds through an endorsement thereto which provides for no different coverage to the additional insureds than to Contractor, and include coverage for the respective officers, directors, employees, agents and other consultants of each and any of such additional insureds. The additional insured endorsements shall provide the following:
 - (a) that the coverage afforded the additional insureds will be primary and non-contributory insurance for the additional insureds with respect to claims arising out of operations performed by or on behalf of the Contractor;
 - (b) that coverage afforded the additional insureds shall not exclude claims asserted by Contractor's employees;
 - (c) that if the additional insureds have other insurance which is applicable to the loss, such other insurance will be on an excess or contingent basis;
 - (d) that the amount of Contractor's liability under the insurance policy will not be reduced by the existence of such other insurance.
7. Include contractual liability insurance covering Contractor's indemnity obligations under paragraphs 6.07, 6.11, and 6.20, including, but not limited to, all fees and charges of engineers, architects, attorneys and other professionals, and all court, arbitration, or other dispute resolution costs;
8. Remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing or replacing defective work in accordance with paragraph 13.06; and
9. With respect to completed operations insurance remain in effect for at least two years after final payment (and Contractor shall furnish Owner and any other additional insured to whom an insurance policy has been furnished evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter).

5.05 Section Reserved.

5.06 Property Insurance:

- A. Contractor shall purchase and maintain property insurance in the amount of the initial Contract Price as well as subsequent modifications thereto for the entire Work at the site on a replacement cost basis. This insurance shall include interests of Owner, Contractor, Subcontractors in the Work, and the Engineer, all of whom shall be listed by name as insureds or additional insureds. Property insurance coverage shall:
1. Be written on a replacement cost basis on an "all risk" Builder's Risk or insurance form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework and Work in transit and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations and water damage;
 2. Include soft cost expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects) in an amount not less than 5 percent of Contract Price;
 3. Cover materials and equipment stored at the site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by the Engineer; and
 4. Be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with thirty days written notice to each other additional insured to whom a certificate of insurance has been issued.

5.07 Cancellation or Change:

All the policies of insurance required to be purchased and maintained by Contractor in accordance with paragraphs 5.04 and 5.06 shall contain a provision or endorsement that the coverage afforded will not be cancelled or materially changed or renewal refused until at least 30 days' prior written notice has been given to Owner, Engineer, and to each other additional insured to whom an insurance policy has been furnished.

5.08 Additional Insureds:

Additional insureds referenced in paragraphs 5.04, 5.06, and 5.07 shall be as follows:

Owner: Madison Water Utility
Address: 119 E. Olin Avenue, Madison, WI 53713
Engineer: Baxter and Woodman, Inc. (Corporate Office)
Address: 8678 Ridgefield Road, Crystal Lake, IL 60012

1.6 ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

A. SC-6.02.B

1. Under paragraph 6.02.B, add: The regular working hours are between 7:00 AM and 5:00 PM, Monday through Friday. In the event Contractor works more than eight hours on any weekday, or works anytime on Saturdays, Sundays, or holidays, during which time the Engineer, Resident Project Representative, or assistants are required to be present, Owner shall pay the cost for such overtime engineering services and shall deduct such cost from payments due Contractor. Overtime engineering services shall be charged at Engineer's standard hourly rates applied on a time and one-half basis for all time over eight hours on any single working day and for all hours on Saturday, and on a double time basis for all Sunday and holiday hours. If the amount due Contractor is not sufficient to cover the cost of overtime engineering services, Contractor shall reimburse Owner in the amount necessary to cover such costs. Legal holidays include:

New Years Day	Memorial Day
Independence Day	Labor Day
Thanksgiving Day	Christmas Day

If the legal holiday falls on Saturday, all hours worked on the preceding Friday and/or the Saturday will be considered as holiday hours. If the legal holiday falls on Sunday, all hours worked on the following Monday will be considered as holiday hours.

B. SC-6.06.A

1. Under paragraph 6.06.A, add: Any person employed by Contractor or Subcontractors who does not perform his work in a proper and skillful manner, or who is intemperate, disorderly, or otherwise objectionable, shall, at the written request of Owner, be forthwith removed from the project site and shall not be employed again in any portion of the Work without written consent of Owner.

C. SC-6.06.B

1. Under paragraph 6.06.B, add: Contractor shall identify all Subcontractors, major Suppliers and other persons or organizations providing principal items of work, material, and equipment. Contractor shall within ten working days of the date on the Notice of Award identify and submit in writing to the Engineer for Owner acceptance the names, addresses, and telephone numbers of all Subcontractors, Major Suppliers, and other persons or organizations providing principal items of work, material, and equipment.

D. SC-6.19.A

1. Delete paragraph 6.19.A and 6.19.B in their entirety and substitute the following:

6.19.A Contractor shall execute and deliver to Owner, before the final payment will be issued, a written warranty which guarantees that all work is in accordance with the Contract Documents and will not be defective. This warranty shall guarantee all work for a period of three years from the date of acceptance of the Work and final payment by Owner, except for equipment, motors, electrical controls, and other mechanical devices which shall be guaranteed for a period of

two years from the date of acceptance and use of each item of equipment by Owner unless a different guarantee period of time is specified under other parts of the Contract Documents.

If within these guarantee periods or such longer period of time as may be prescribed by the Contract Documents, any work is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions, either correct such defective work, or, if it has been rejected by Owner, remove it from the site and replace it with nondefective work. If Contractor does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective work corrected or the rejected work removed and replaced, and all direct and indirect costs of such repair and/or replacement of work, including compensation for additional professional services, shall be paid or reimbursed to Owner by Contractor.

Contractor shall furnish a warranty bond in an amount equal to five percent (5%) of the Contract Price, but not less than \$10,000, by a surety satisfactory to Owner to guarantee Contractor's warranty to repair or replace defective work. The warranty bond shall be in addition to Contractor's contract Performance-Payment Bond, and shall be delivered to Owner prior to final payment to Contractor for the Work. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

E. SC-6.20.C

1. Under paragraph 6.20.C, add: Except insofar as indemnification is sought by Engineer or Engineer's Consultants for litigation type expenses including, but not limited to, all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs.

1.7 ARTICLE 8 - OWNER'S RESPONSIBILITIES

A. SC-8.06

1. Delete paragraph 8.06 in its entirety.

1.8 ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

A. SC-9.03

1. Under the paragraph 9.03.A., delete the second sentence.
2. Under paragraph 9.03A add the following:

A LISTING OF THE DUTIES, RESPONSIBILITIES AND LIMITATIONS OF AUTHORITY OF THE RESIDENT PROJECT REPRESENTATIVE (RPR).

A. General

RPR is Engineer's agent at the site, will act as directed by and under the supervision of Engineer, and will confer with Engineer regarding RPR's dealings in matters pertaining to the on-site work shall in general be with Engineer and Contractor keeping Owner advised as necessary. RPR's dealings with subcontractors will only be through or with the full knowledge

and approval of Contractor. RPR shall generally communicate with Owner with the knowledge of and under the direction of Engineer.

B. Duties and Responsibilities of RPR

1. *Schedules:* Review the progress schedule, schedule of the Shop Drawing submittals and schedule of values prepared by Contractor and consult with Engineer concerning acceptability.
2. *Conferences and Meetings:* Attend meetings with Contractor, such as preconstruction conferences, progress meetings, job conferences and other project-related meetings, and prepare and circulate copies of minutes thereof.
3. *Liaison:*
 - a. Serve as Engineer's liaison with Contractor, working principally through Contractor's superintendent and assist in understanding the intent of the Contract Documents; and assist Engineer in serving as Owner's liaison with Contractor when Contractor's operations affect Owner's on-site operations.
 - b. Assist in obtaining from Owner additional details or information, when required for proper execution of the Work.
4. *Shop Drawings and Samples:*
 - a. Record date of receipt of Shop Drawings and samples.
 - b. Receive samples which are furnished at the site by Contractor, and notify Engineer of availability of samples for examination.
 - c. Advise Engineer and Contractor of the commencement of any Work requiring a Shop Drawing or sample if the submittal has not been approved by Engineer.
5. *Review of Work, Rejection of Defective Work, Inspections and Tests:*
 - a. Conduct on-site observations of the Work in progress to assist Engineer in determining if the Work is in general proceeding in accordance with the Contract Documents.
 - b. Report to Engineer whenever RPR believes that any Work is unsatisfactory, faulty or defective or does not conform to the Contract Documents, or has been damaged, or does not meet the requirements of any inspection, test or approval required to be made; and advise Engineer of Work that RPR believes should be corrected or rejected or uncovered for observation, or requires special testing, inspection and approval.
 - c. Verify that tests, equipment and systems startups and operating and maintenance training are conducted in the presence of appropriate personnel and that Contractor maintains adequate records thereof; and observe, record and report to Engineer appropriate details relative to the test procedures and startups.
 - d. Accompany visiting inspectors representing public or other agencies having jurisdiction over the Project, record the results of these inspections and report to Engineer.

6. *Interpretation of Contract Documents:* Report to Engineer when clarifications and interpretations of the Contract Documents are needed and transmit to Contractor clarifications and interpretations as issued by Engineer.
7. *Modifications:* Consider and evaluate Contractor's suggestions for modifications in Drawings or Specifications and report with RPR's recommendations to Engineer. Transmit to Contractor decisions as issued by Engineer.
8. *Records:*
 - a. Maintain at the job site orderly files for correspondence, reports of job conference, Shop Drawings and samples, reproductions of original Contract Documents including all Work Directive Changes, Addenda, Change Orders, Field Orders, additional Drawings issued subsequent to the execution of the Contract, Engineer's clarifications and interpretations of the Contract Documents, progress reports, and other Project related documents.
 - b. Complete a Daily Report recording Contractor hours on the job site, weather conditions, data relative to questions or Work Directive Changes, Change Orders or changed conditions, list of job site visitors, daily activities, decisions, observations in general, and specific observations in more detail as in the case of observing test procedures; and send original to Engineer.
 - c. Record names, address and telephone numbers of all Contractors, subcontractors and major suppliers of materials and equipment.
9. *Reports:*
 - a. Furnish Engineer periodic reports as required of progress of the Work and the Contractor's compliance with the progress scheduled and schedule of Shop Drawings and sample submittals.
 - b. Consult with Engineer in advance of schedule major tests, inspections or start of important phases of the Work.
 - c. Draft Field Orders, obtain backup material from Contractor and recommend to Engineer Change Orders and Work Directive Changes. Furnish Engineer copies of all Field Orders.
 - d. Report immediately to Engineer and Owner upon occurrence of any accident.
10. *Payment Requests:* Review applications for payment with Contractor for compliance with the established procedure for their submission and forward with recommendations to Engineer, noting particularly the relationship of the payment requested to the schedule of values. Work completed and materials and equipment delivered at the site but not incorporated in the Work.

11. *Certificates, Operation and MAINTENANCE Manuals:* During the course of the Work, verify that certificates, operation and maintenance manuals and other data required to be assembled and furnished by Contractor are applicable to the items actually installed and in accordance with the Contract Documents, and have this material delivered to Engineer for review and forwarding to Owner prior to final payment for the Work.
12. *Completion:*
 - a. Before Engineer issues a Certificate of Substantial Completion, prepare and furnish to the Engineer a list of observed items requiring completion or correction.
 - b. Conduct final inspection in the company of Engineer, Owner, and Contractor and prepare and furnish to the Engineer a final list of items to be completed or corrected.
 - c. Observe that all items on final list have been completed or corrected and make recommendations to Engineer concerning acceptance.

C. Limitations of Authority

Resident Project Representative:

1. Shall not authorize any deviation from the Contract Documents or substitution of materials or equipment, unless authorized by Engineer.
2. Shall not exceed limitations of Engineer's authority as set forth in the Agreement or the Contract Documents.
3. Shall not undertake any of the responsibilities of Contractor, subcontractors or Contractor's superintendent.
4. Shall not advise on, issue directions relative to or assume control over any aspect of the means, methods, techniques, sequences or procedures or construction unless such advice or directions are specifically required by the Contract Documents.
5. Shall not advise on, issue directions relative or assume control over safety precautions and programs in connection with the Work.
6. Shall not accept Shop Drawing or sample submittals from anyone other than Contractor.
7. Shall not authorize Owner to occupy the Project in whole or in part.
8. Shall not participate in specialized field or laboratory tests or inspections conducted by others except as specifically authorized by Engineer.

1.9 ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

- A. SC-12.04 through 12.06
1. Add the following paragraphs:

12.04 Start and Completion Times

The date of beginning and the time for completion of the Work are essential conditions of the Agreement and the Work required shall be commenced on a date specified in the Notice to Proceed.

12.05 Time for Completion

Contractor shall proceed with the Work at such rate of progress to insure full completion within the Contract Times. It is expressly understood and agreed, by and between the Contractor and the Owner, that the Contract Times for the completion of the Work described herein is a reasonable time, taking into consideration the adverse weather conditions for the season, or seasons, involved and other factors prevailing in the locality of the Work.

The Contract Substantial Completion Date shall be November 30, 2013. The Contract Final Completion date shall be December 31, 2013.

12.06 Liquidated Damages

Contractor understands that time is of the essence and that Owner will suffer financial loss if the Work is not completed within the times or by the dates specified in the Bid Form, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. Contractor also recognizes the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Contractor shall pay Owner as liquidated damages for delay (but not as a penalty) the amount as noted in City of Madison Contract, for each day that expires after the time or date specified in the Bid Form for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner the amount as noted in City of Madison Contract, for each day that expires after the time or date specified in the Bid Form for completion and readiness for final payment.

1.10 ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

A. SC-13.10

1. Add new paragraph 13.10 as follows:

13.10 Notification and Time Limit for Repairs:

- A. Contractor shall be responsible for the proper and safe protection of his work at all times during construction and also during the three-year guarantee period after the acceptance of the completed work by Owner. Contractor shall provide, erect, and maintain barricades, red flags, and torches and lights at all places where work is in progress, and wherever else required by Owner.
- B. Contractor shall maintain an emergency phone number where he/she can be notified at any time, Sundays and holidays included, of an emergency condition due to the work which requires immediate repair or protection. Upon such notification by Owner, Contractor shall be given a two-hour time limit to provide whatever barricades, flags, torches and lights are required to mark and protect the hazard. If Contractor fails to provide this protection within the two-hour period from time of notification, Owner will provide the necessary protection and deduct the sum of \$200.00 for each occurrence from the monies due and payable to Contractor for completed work.
- C. Also, upon notification by Owner, Contractor shall be given a 24-hour time limit to begin to make any repairs to the Work as deemed necessary by Owner. If Contractor fails to proceed with necessary repairs within the 24-hour notification period, Owner will make the necessary repairs to the Work and deduct the cost of labor and materials, including engineering costs, for each repair incident from the monies due and payable to Contractor for completed work.

1.11 ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

A. SC-14.01

1. Add the following paragraph after paragraph 14.01.A:

- B. Contractor shall submit revisions to the initial schedule of progress payments whenever actual outlays for the Work vary beyond -5 percent and +10 percent from the schedule, as determined by Engineer.

B. SC-14.02

1. Under paragraph 14.02.A.1, delete the remainder of the first sentence after "(but not more than one a month)" and insert the following:
Contractor shall submit to Engineer for review an original plus four duplicate copies of each Application for Payment and each copy shall be accompanied by a "Sworn Statement For Contractor And Subcontractor To Owner" on a pre-printed or computer generated form similar to Certificate 00 62 76.01.
2. Delete paragraph 14.02.A.3, and substitute the following:

Periodic partial payments shall be for the value of the completed work less a retained amount of 5 percent of the value of completed work as approved by Engineer until construction is 50 percent complete, after which no additional amount will be retained if Contractor is making progress to Owner's satisfaction and there is no specific cause for withholding 5 percent of the total value of completed work. At 50 percent completion or any time thereafter when the progress of the work is not satisfactory, additional amounts may be retained up to 10 percent of the value of the work completed. When the project is substantially complete and available for Owner's operational or beneficial occupancy, the retained amount shall be reduced to only that amount estimated by Engineer as necessary to assure completion of the Work. The final payment, including the retained amount, shall be payable within 30 days after the completion of the Work, approval by Engineer and acceptance by Owner. The acceptance of the final payment by Contractor shall be considered to be a waiver of all claims against Owner under the Agreement.

C. SC-14.02.C

1. Under paragraph 14.02.C, change "Ten" to "Within 30".

D. SC-14.03

1. Under paragraph 14.03.A, add the following:

B. Contractor shall procure from each Subcontractor and Supplier of material or labor a waiver of any claim which they may have under the mechanics lien laws of the state in which the Work is located, to insure Owner immunity from mechanics liens on account of anything which is done by Contractor or his Subcontractors in carrying out the Agreement and any work orders for additions thereto, all as a condition of any payment by Owner. Any payments made by Owner without requiring compliance with this paragraph shall not be construed as a waiver by Owner of the right to require compliance with this paragraph as a condition of later payments. Contractor shall furnish with his final Application for Payment a complete release of all liens arising out of this contract, or receipts in full in lieu thereof and an affidavit that the releases and receipts include all labor and material for which a lien could be filed.

E. SC-14.07

1. Under paragraph 14.07.C, change "Thirty" to "Sixty".

1.12 ARTICLE 18 - EQUAL EMPLOYMENT OPPORTUNITY - AFFIRMATIVE ACTION NOTICE

A. SC-18.01 Equal Employment

1. Contractor shall comply with the equal employment opportunity affirmative action required by the City of Madison.

1.13 ARTICLE 19 – PREVAILING WAGE RATES

A. SC-19.01 Prevailing Wage Rates

1. Contractor shall comply with the attached prevailing wage rates as determined by the State of Wisconsin Department of Workforce Development (DWD). If DWD finds a contractor violating the prevailing wage law DWD will assess liquidated damages of 100% of the wages owed to employees.
2. Contractor shall comply with all applicable federal, state, and local rules and regulations regarding the posting, certification, and filing of wage rates paid to employees. Contractor shall file certified payroll records with DWD on a monthly basis in a format that meets DWD reporting requirements. Certified payroll reports must be filed with DWD by the end of the first week following the month in which the work was conducted.
3. Upon completion of the Work and prior to final payment, Contractor shall file with Owner, the attached affidavit of compliance with prevailing wage rate determination.

END OF SUPPLEMENTARY CONDITIONS

SECTION 01 14 11

CONTRACTOR USE OF PREMISES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section applies to all situations in which the Contractor or his representatives including, but not necessarily limited to, suppliers, subcontractors, employees, and field engineers, enter upon the Owner's property.

1.2 QUALITY ASSURANCE

- A. Promptly upon award of the Contract, notify all pertinent personnel regarding requirements of this Section.
- B. Require that all personnel who will enter upon the Owner's property certify their awareness of and familiarity with the requirements of this Section.

1.3 NOISE CONTROL

- A. Conduct operations to cause the least annoyance to residents in the vicinity of the Work and comply with City of Madison Ordinances.
- B. Work hours shall be between 7 AM and 7 PM, Monday thru Friday, except legal holidays and unless otherwise agreed to in writing from Owner.
- C. Equip all mechanical devices and engines with adequate silencers and mufflers.

1.4 USE AND RESTORATION OF THE SITE

- A. Before submitting Final Application for Payment, restore all areas within the work site boundaries disturbed by the Work to a fully regraded condition, provided with at least four (4) inches of hand raked topsoil and seeded as specified under Section 32 92 00.13.
- B. Clean all permanent roadways used for construction activities by using motorized street sweeper that utilizes vacuum and water to pick up debris, when directed by Engineer.

1.5 CONTRACTOR'S INGRESS AND EGRESS

- A. Truck and Equipment access:
 - 1. To avoid traffic conflict with vehicles of the Owner's employees do not park near Unit Well 20 building, within rear parking lot, or access drive. Avoid overloading of streets and driveways elsewhere on the Owner's property.
 - 2. Provide adequate protection for curbs and sidewalks over which trucks and equipment pass to reach the work site.

- B. Contractor's vehicles:
 - 1. Park cars legally on any street or other areas privately arranged by the Contractor.
- C. Restoration: Clean and restore to at least the preconstruction condition all roadways, streets, sidewalks, driveways, and parking areas used during construction.

1.6 ACCESS TO OWNER'S FACILITIES

- A. Restricted areas and structures:
 - 1. Do not enter any designated restricted area or any existing structure, except as required to do specific work.
 - 2. Obtain Owner's permission to enter restricted areas or existing structures to do specific work.
 - 3. Remove all construction debris and clean work areas daily when working in restricted areas or existing structures.
- B. Equipment:
 - 1. Do not use Owner's equipment or tools.

1.7 PROTECTION OF EXISTING PROPERTY AND EQUIPMENT

- A. Property:
 - 1. Take all necessary precautions to protect existing structures, piping, trees and all other facilities from damage during construction, and comply with Section 31 23 79, paragraph 3.2 of these Specifications.
 - 2. Repair or replace all property damaged during construction.
- B. Equipment:
 - 1. Take all necessary precautions to protect all equipment from sand, dust, water and other debris which is produced during construction.
 - 2. Wherever possible, cut concrete or masonry from outside the structure to prevent production of dust in areas containing equipment.
 - 3. During dust-producing activities inside of structures, isolate work area from equipment using temporary impervious partitions or individual equipment encasement.
 - 4. Under excessive dust conditions, ventilate isolated working areas.
 - 5. Remove all temporary equipment protection facilities upon completion of construction activity requiring such protective measures.

1.8 DISPOSAL OF SPOIL

- A. Remove all spoil, excess excavated material, or other construction activity residual materials from the work site. Do not deposit this material on private or public property without written permission from property owner or authorized representative of the appropriate public agency.

1.9 CONTRACTOR'S STORAGE AREA

- A. Do not store construction equipment, tools or materials on any area of the Owner's property except where shown on the Drawings as the "Contractor's Storage Area," or where otherwise directed by the Engineer.

1.10 SECURITY

- A. Restrict the access of all persons entering upon the Owner's property in connection with the Work to the actual site of the Work.

END OF SECTION

SECTION 01 14 15

PLANT OPERATION DURING CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Prepare and maintain a sequence of construction which will ensure the continuance of water delivery from at least one booster pump into the high pressure zone, except for minor outages lasting no longer than 4 hours in duration throughout the duration of the Project.
- B. The well pump, well pump motor, piping or electrical gear affecting delivery of water from the well shall not be removed from service between July 1, 2013 and September 3, 2013, except for minor outages of less than 4 hours in duration. Well water delivery may be suspended for extended periods of time before or after the noted summer month restrictions.
- C. All booster or well pump delivery outages must be approved by the Water Utility prior to any service removals.

1.2 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 01.
- B. Within 30 calendar days after the Contractor has received the Owner's Notice to Proceed and as a part of the construction schedule required by Section 01 32 16, submit a detailed sequence of construction showing how the new work will be completed without interruption of the existing process.

1.3 OPERATION OF WELL FACILITIES

- A. The Owner will operate and maintain permanent facilities used for the pump station and delivery of water into the distribution system. No water main or equipment shall be removed from service nor shall the power to any part of the plant be discontinued without the approval of the Engineer. The Owner shall operate temporary pumping equipment as noted in Section 44 42 56.15.
- B. Contractor shall not restrict access to Unit Well 20 Building or other facilities as required for delivery of water to distribution system.

END OF SECTION

SECTION 01 26 13

REQUESTS FOR INTERPRETATION

PART 1 - GENERAL

1.1 SUMMARY: REQUESTS FOR INTERPRETATION (RFI)

- A. The Contractor may submit Requests For Interpretation (RFI) to the Engineer to expedite the Contractor's performance on the Project. RFIs will be submitted following the requirements, all as described in this Section.
- B. Work not included:
 - 1. Incomplete submittals will not be reviewed by the Engineer.
 - 2. The Contractor may require his subcontractors to provide drawings, setting diagrams, and similar information to help coordinate the Work, but such data shall remain between the Contractor and his subcontractors and will not be reviewed by the Engineer unless specifically called for within the Contract Documents.

1.2 SUBMITTALS

- A. Make submittals of RFI's in accordance with the provisions of this Section.
- B. Prior to submitting each RFI, the Contractor shall first carefully study and compare the Contract Documents, field conditions, other Owner provided information, Contractor prepared Coordination Drawings, and prior Project correspondence and documentation to determine that the information requested is not reasonably obtainable from such sources.
- C. The Contractor shall submit each RFI sufficiently in advance of the date by which such information is required to allow the Engineer sufficient time, in the Engineer's professional judgement, to permit adequate review and response and to permit Contractor compliance with the latest construction schedule.

PART 2 - PRODUCTS

This Subsection intentionally left blank.

PART 3 - EXECUTION

3.1 IDENTIFICATION OF SUBMITTALS

- A. Each RFI shall be submitted to the Engineer, in writing, on such form and with such accompanying information as the Engineer may require for such purpose. Each RFI shall identify the specific sources which were reviewed by the

Contractor in its efforts to determine the information requested, and a statement to the effect that the information being requested could not be determined from such sources.

- B. Consecutively number all submittals.
 - 1. When material is submitted for any reason, transmit under a new letter of transmittal and with a new transmittal number.
 - 2. On re-submittals, cite the original submittal number for reference.
- C. Accompany each submittal with a letter of transmittal showing all information required for identification and checking.
 - 1. Use Request for Interpretation (RFI) Form, RFI 01 26 13.13-1.
- D. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.
- E. Submittal log:
 - 1. Maintain an accurate submittal log for the duration of the Work, showing current status of all submittals at all times, the date of the request, to whom the request was made, by whom the request was made, the nature of the request, and the Engineer's resolution thereof.
 - 2. Make the submittal log available to the Engineer for the Engineer's review upon request.
 - 3. Review this log at each Project Meeting and make the resolution of RFIs a part of the minutes of such meetings.

END OF SECTION

REQUEST FOR INTERPRETATION (RFI) FORM

RFI NO. _____

Contractor requests for interpretation will be considered upon receipt of this completed RFI Form. By submission of this form the Contractor attests to the fact that having carefully reviewed the Contract Documents and coordinated the Work with the appropriate trades and reviewed field conditions, that the information requested cannot be determined from such efforts as called for in the General Conditions of the Contract.

Date: _____ Project: _____

To: _____

Description of Requested Interpretation: _____

Specification References: _____

Drawing References: _____

Proposed method of resolving issue. Sketches and/or Pages Attached: ____ Yes, ____ No

Potential impact on project cost: _____

Response Date: _____ List date by which response by Engineer is requested to maintain project schedule. (Allow sufficient time for response).

Signed: _____, Project Superintendent
Signature signifies acceptance of responsibility for accuracy and completeness of information.

ENGINEER'S RESPONSE

Notations listed below indicate the Engineer's action on method proposed by the Contractor to resolve issues or remarks in response to RFI when no Contractor recommendation has been provided. Changes to Contract Amount and/or project time shall be processed using standard Change Order Forms. Sketched and/or Pages Attached ____ Yes ____ No

Signed: _____ Date: _____

SECTION 01 31 14

PROJECT COORDINATION AND CONSTRUCTION PHASING

PART 1 - GENERAL

1.1 SUMMARY

- A. This section describes the Contractor's general project coordination and construction phasing requirements under this Contract.
- B. Coordinate construction activities with the Owner and Engineer.
- C. Follow specific procedures and project phasing requirements specified in this Section.
- D. Submit the plan of construction phasing to the Owner and Engineer for review two working days prior to the pre-construction conference.

1.2 SUBMITTALS

- A. Submit a detailed plan for phasing of construction in all areas and phasing of construction and restoration that will illustrate compliance with project phase completion requirements.
 - 1. Define construction activities on a week-by-week basis.
 - 2. Define subcontractor work activities.
 - 3. Allow for reasonable periods of delays caused by inclement weather.

1.3 CONTRACTOR'S REQUIREMENTS

- A. Prepare and maintain a sequence of construction which will ensure the continuance of water delivery from at least one booster pump into the high pressure zone, except for minor outages lasting no longer than 4 hours in duration throughout the duration of the Project.
- B. The well pump, well pump motor, piping or electrical gear affecting delivery of water from the well shall not be removed from service between July 1, 2013 and September 3, 2013, except for minor outages of less than 4 hours in duration. Well water delivery may be suspended for extended periods of time before or after the noted summer month restrictions.
- C. All booster or well pump delivery outages must be approved by the Water Utility prior to any service removals.
- D. Booster Pump Installation Phasing: Contractor shall provide the following sequence of activities regarding booster pump removals and replacements.
 - 1. Contractor to ready temporary booster pumping equipment and have plan in place to have this in place after removal of either Booster Pump No. 1 (BP-1) or Booster Pump No. 2 BP-2).

PROJECT COORDINATION AND CONSTRUCTION PHASING

01 31 14-1 (120851.40)

2. Remove either Booster Pump No. 1 (BP-1) or Booster Pump No. 2 BP-2).
 3. Contractor to test temporary booster pumping equipment.
 4. Contractor to complete installation of new BP-1 or BP-2, including disinfection and testing.
 5. Contractor to remove and re-install remaining booster pump, including disinfection and testing.
- D. Electrical Phasing: Contractor to coordinate electrical work to achieve above and as described in detail on the drawings and within pertinent electrical specifications. This includes coordination of service line improvements.
- E. Seeding and Sodding: Complete all exterior excavation and piping work prior to September 31, 2013 to allow for seeding and sodding of all disturbed areas. Restore all disturbed areas within 2 weeks of start of earth disturbance.
- F. Project Completion: Complete project as set forth in Item 1.9.A.1 of the Supplementary Conditions, Section 00 73 00.13.

PART 2 - PRODUCTS

No products are required in this Section.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Construct the proposed facilities in a timely manner and comply with these project coordination and construction phasing requirements.

END OF SECTION

SECTION 01 31 19
PROJECT MEETINGS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work included: To enable orderly review during progress of the Work, and to provide for systematic discussion of problems, the Engineer will conduct project meetings throughout the construction period.
- B. Related work:
 - 1. The Contractor's relations with his subcontractors and materials suppliers, and discussions relative thereto, are the Contractor's responsibility and normally are not part of project meetings content.

1.2 SUBMITTALS

- A. Agenda items: To the maximum extent practicable, advise the Engineer at least 24 hours in advance of project meetings regarding items to be added to the agenda.
- B. Minutes:
 - 1. The Engineer will compile minutes of each project meeting, and will furnish three copies to the Contractor and required copies to the Owner.
 - 2. Recipients of copies may make and distribute such other copies as they wish.

1.3 QUALITY ASSURANCE

- A. For those persons designated by the Contractor to attend and participate in project meetings, provide required authority to commit the Contractor to solutions agreed upon in the project meetings.

PART 2 - PRODUCTS

(No products are required in this Section)

PART 3 - EXECUTION

3.1 MEETING SCHEDULE

- A. Project meetings will be scheduled at the Pre-construction Meeting.

- B. Coordinate as necessary to establish mutually acceptable schedule for meetings.

3.2 MEETING LOCATION

- A. The Engineer will establish meeting location. To the maximum extent practicable, meetings will be held at the job site.

3.3 PRECONSTRUCTION MEETING

- A. Pre-construction Meeting will be scheduled to be held within 20 working days after the effective date of the Agreement.
 - 1. Provide attendance by authorized representatives of the Contractor and major subcontractors.
 - 2. The Engineer will advise other interested parties, including the Owner, and request their attendance.
- B. Minimum agenda: Data will be distributed and discussed on at least the following items:
 - 1. Organizational arrangement of Contractor's forces and personnel, and those of subcontractors, materials suppliers, and Engineer.
 - 2. Channels and procedures for communications.
 - 3. Construction schedule, including sequence of critical work.
 - 4. Contract Documents, including distribution of required copies of original Documents and revisions.
 - 5. Processing of Shop Drawings and other data submitted to the Engineer for review.
 - 6. Processing of Bulletins, field decisions, and Change Orders.
 - 7. Rules and regulations governing performance of the Work; and
 - 8. Procedures for safety and first aid, security, quality control, housekeeping, and related matters.

3.4 PROJECT MEETINGS

- A. Attendance:
 - 1. To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout progress of the Work.
 - 2. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspect of the Work is involved.

END OF SECTION

SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULES

PART 1 - GENERAL

1.1 SUMMARY

- A. Prepare and maintain the schedules and reports described in this Section to assure adequate planning and execution of the Work so that the Work is completed within the Contract Times, and to assist the Engineer in appraising the reasonableness of the proposed schedule and in evaluating progress of the Work.

1.2 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 01.
- B. Construction schedule: Prior to submission of the first Application for Payment, but no later than 30 calendar days after Contract Times commence, submit to the Engineer one reproducible copy and four prints of a construction schedule prepared in accordance with Part 3 of this Section.
- C. Periodic reports: Prior to submittal of Application for Payment for completed work coinciding with 50 percent and 80 percent of the Contract Price, submit to the Engineer four prints of the construction schedule updated as described in Part 3 of this Section.

1.3 QUALITY ASSURANCE

- A. Perform data preparation, analysis, charting, and updating in accordance with standards approved by the Engineer.
- B. Reliance upon the approved schedule:
 - 1. The construction schedule as approved by the Engineer will be an integral part of the Contract and will establish interim completion dates for the various activities under the Contract.
 - 2. Processing of the first Application for Payment will not be completed by the Engineer until the construction schedule has been submitted in accordance with 1.2 B. above.
 - 3. Processing of the 50 percent and 80 percent progress payment applications will not be completed by the Engineer until the periodic reports have been submitted in accordance with 1.2 C. above.

PART 2 - PRODUCTS

2.1 CONSTRUCTION ANALYSIS

- A. Graphically show by Critical-Path (CPM), Program Evaluation and Review Technique (PERT), Precedence Methods, bar-chart, or other means acceptable to the Engineer, the order and interdependence of all activities necessary to complete the Work, and the sequence in which each activity is to be accomplished, as planned by the Contractor and his project field superintendent in coordination with all subcontractors whose work is shown on the diagram.
- B. Include, but do not necessarily limit indicated activities to:
 - 1. Project mobilization.
 - 2. Work elements.
 - 3. Special material and equipment installation and testing.
 - 4. Final cleanup.
 - 5. Final inspecting and testing.
 - 6. All activities by the Engineer that affect progress, required dates for completion, or both, for all and each part of the work.
 - 7. Contractor's anticipated working dates.

PART 3 - EXECUTION

3.1 CONSTRUCTION SCHEDULE

- A. As soon as practicable after receipt of Notice to Proceed, complete the construction schedule in preliminary form, meet with the Engineer, review contents of the proposed construction schedule, and make all revisions agreed upon.
- B. Submit in accordance with Paragraph 1.2 B. above.

3.2 PERIODIC REPORTS

- A. As required under Paragraph 1.2 C. above, update the approved construction schedule.
 - 1. Indicate "actual" progress in percent completion for each activity;
 - 2. Provide written narrative summary of revisions causing delay in the program, and an explanation of corrective actions taken or proposed.

3.3 REVISIONS

- A. Make only those revisions to approved construction schedule as are approved in advance by the Engineer.

END OF SECTION

SECTION 01 33 01

SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY

- A. Make submittals required by the Contract Documents, and revise and resubmit as necessary to establish compliance with the specified requirements, all as described in this Section.
- B. Related work:
 - 1. Individual requirements for submittals will be described in pertinent Sections of these Specifications.
 - a. The process for securing approval of proposed substitutions is described in Section 01 62 01, "Product Options and Substitutions."
- C. Work not included:
 - 1. Unrequired submittals will not be reviewed by the Engineer.
 - 2. The Contractor may require his subcontractors to provide drawings, setting diagrams, and similar information to help coordinate the Work, but such data shall remain between the Contractor and his subcontractors and will not be reviewed by the Engineer unless specifically called for within the Contract Documents.

1.2 SUBMITTALS

- A. Make submittals of Shop Drawings, Samples, Substitution Requests, progress schedules and other items in accordance with the provisions of this Section.

1.3 QUALITY ASSURANCE

- A. Coordination of submittals:
 - 1. Prior to each submittal, carefully review and coordinate all aspects of each item being submitted.
 - 2. Verify that each item and the submittal for it conform in all respects with the specified requirements.
 - 3. By affixing the Contractor's signature and his certification stamp to each submittal, certify that this coordination has been performed.
- B. Resubmittals and reimbursement of Engineer's costs.
 - 1. The Engineer will record all time used by the Engineer in the review of any third and subsequent submittals.
 - 2. The Owner will reimburse the Engineer at the Engineer's standard hourly rate for all time spent in such third and subsequent reviews and deduct such costs from payments due the Contractor.

PART 2 - PRODUCTS

2.1 SHOP DRAWINGS

- A. Make Shop Drawings accurately to a scale sufficiently large to show all pertinent aspects of the item and its method of connection to the Work.
 - 1. Shop Drawings are not required for manholes, valve vaults, catch basins, pipe, and appurtenances needed for infrastructure systems (storm sewers, sanitary sewers, and water distribution) so long as the items are the materials and manufacturers specified in the project manual.
- B. Submit the number of copies which are required to be returned, plus five copies which will be retained by the Engineer.
 - 1. Collate each copy of the required number of shop drawing sets to be submitted and include one of each item for that current submittal.
- C. Collate each copy of the required number of shop drawing sets to be submitted and include one of each item for that current submittal.

2.2 MANUFACTURERS' LITERATURE

- A. Where contents of submitted literature from manufacturers includes data not pertinent to the submittal, clearly show which portion of the contents is being submitted for review.
- B. Submit the number of copies which are required to be returned, plus five copies which will be retained by the Engineer.

2.3 SAMPLES

- A. Provide Sample or Samples identical to the precise article proposed to be provided. Identify as described under "Identification of submittals" below.
- B. Number of Samples required:
 - 1. Unless otherwise specified, submit Samples in the quantity which is required to be returned, plus one which will be retained by the Engineer.
 - 2. By prearrangement in specific cases, a single Sample may be submitted for review and, when approved, be installed in the Work at a location agreed upon by the Engineer.

2.4 COLORS AND PATTERNS

- A. Unless the precise color and pattern is specifically called out in the Contract Documents, and whenever a choice of color or pattern is available in the specified products, submit accurate color and pattern charts to the Engineer for selection.

2.5 MANUFACTURERS' RECOMMENDED INSTALLATION PROCEDURES

- A. Maintain in a safe place at the site one copy of manufacturers' recommended installation procedures for all equipment and materials.
 - 1. Make these installation procedures readily available to the Engineer for reference.
- B. When the manufacturers' recommended installation procedures are submitted as part of the shop drawings required by the Contract Documents, approval of such installation procedures by the Engineer will not be required.

PART 3 - EXECUTION

3.1 IDENTIFICATION OF SUBMITTALS

- A. Consecutively number all submittals.
 - 1. When material is submitted for any reason, transmit under a new letter of transmittal and with a new transmittal number.
 - 2. On resubmittals, cite the original submittal number for reference.
- B. Accompany each submittal with a letter of transmittal showing all information required for identification and checking.
 - 1. Use Contractor's Submittal Transmittal Form, Attachment 01 33 01.
- C. On at least the first page of each submittal, and elsewhere as required for positive identification, show the submittal number in which the item was included.
- D. Submittal log:
 - 1. Maintain an accurate submittal log for the duration of the Work, showing current status of all submittals at all times.
 - 2. Make the submittal log available to the Engineer for the Engineer's review upon request.

3.2 GROUPING OF SUBMITTALS

- A. Unless otherwise specified, make submittals in groups containing all associated items to assure that information is available for checking each item when it is received.
 - 1. Partial submittals may be rejected as not complying with the provisions of the Contract.
 - 2. The Contractor may be held liable for delays so occasioned.
 - 3. Do not submit unrelated items in group submittals.

3.3 TIMING OF SUBMITTALS

- A. Make submittals far enough in advance of scheduled dates for installation to provide time required for reviews, for securing necessary approvals, for possible revisions and resubmittals, and for placing orders and securing delivery.

- B. In scheduling, allow at least ten working days for review by the Engineer following the Engineer's receipt of the submittal.

END OF SECTION

SUBMITTALS
01 33 01-4 (120851.40)

ATTACHMENT 01 33 01

CONTRACTOR'S SUBMITTAL TRANSMITTAL FORM

TO: BAXTER & WOODMAN, INC.
2801 COHO STREET, SUITE 204
MADISON, WI 53713

DATE: _____

ATTN: _____

PROJECT NAME: _____

FROM: _____ SPEC NO. _____

_____ ENGR. DWG. NOS. _____

_____ TRANSMITTAL NO. _____

1. The following submittals are forwarded for your review:

No. of Copies	Manufacturer	Description	Drawing No.	Date
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

2. Have all field measurements, field construction criteria, materials, dimensions, catalog numbers, and similar data been determined and verified? Yes ___ No ___

3. Has work indicated in this submittal been coordinated with all trades? Yes ___ No ___

4. Is work by all trades being provided as necessary to accommodate this submittal? Yes ___ No ___

5. Contractor has approved submittal and has affixed his certification stamp. Yes ___ No ___

6. Contractor's description and justification for deviations from Contract Documents.
(Use additional sheet if necessary.)

7. Remarks: _____

Signature: _____

10/00

SAMPLE SHOP DRAWING INDEX AND INSTRUCTIONS

Shop Drawing Index Page 1 of
Const Job No: Bill-Grp-Id: 001
Client: **01/01/2008 00:00:00 AM**
Substantial Completion:
Completion:
Project Manager:

Spec No	Item Description	Supplier ID	MANUFACTURER AND/OR SUPPLIER	Supplier Company Name	Supplier Contact	Supplier Phone	Supplier	Item Delivery INFORMATION	Item Cond
1	2	3	4	5	6	7	8	9	
01 31 14- 601-1.02	PROJECT COORDINATION AND CONSTRUCTION PHASING								
01 50 00- 601-1.02	JOB SIGN								
01 78 39- 601-1.02	PROJECT RECORD DOCUMENTS								

See below left

Approval Needed	Due at BEM	Date Rec'd	Action	Action Date	Test Rec'd	Test Date	Accounts	Required	Date	Col'd	Required	Date	Col'd
10	11	12	13	14	15	16	17	18	19	20	21	22	23

See above right

SHOP DRAWING INDEX (COMPUTERIZED)

FORM PURPOSE:

To provide the Contractor with a positive means of control on the placement of orders, shop drawings and operation and maintenance manuals, process, delivery of materials, and the completion of their Construction Progress Schedule.

To provide the Owner and/or Engineer with a positive means to monitor the Contractor's progress as it relates to the above items.

To provide a management tool for Project Managers (Owner or Engineer). Project management is determined by information controlled.

To provide the Owner with a record of equipment items, manufacturer's name, manufacturers or phone number, and individual most knowledgeable of that particular item of equipment.

FORM COMPLETED BY:

Baxter & Woodman, Inc.

Column Nos. 1, 2, 15, 18, and 21. Copy furnished to Contractor for information at the time that the Notice to Proceed is sent to the Contractor.

Column Nos. 11, 12, 13, 14, 16, 17, 19, 20, 22, 23, and 24; as they occur.

Contractor

Column Nos. 3, 4, 5, 6, 7, and 10 and return to Engineer within 10 calendar days after the Notice to Proceed.

Column Nos. 8 and 9 as they occur. It is suggested that the information be updated and forwarded to Baxter & Woodman, Inc. no less than bi-weekly.

SPECIAL INSTRUCTIONS OR INFORMATION:

Column 3. Company Name: Use complete company name (Baxter & Woodman, Inc.).

Column 5. Phone: A complete telephone number includes the area code.

Column 6. Contact Person: Use Individual's full name.

Columns 13 and 17. Action taken:

NET (No Exception Taken) - **NO FURTHER SUBMITTALS REQUIRED FOR THIS ITEM.**

REJECT (Rejected) - Complete resubmittal is required on all submittals until approved.

MCN (Make Corrections Noted) – **NO FURTHER SUBMITTALS REQUIRED FOR THIS ITEM.**

R&R (Revise & Resubmit) - Complete resubmittal is required on all submittals until approved.

SSI (Submit Specified Items) - Complete resubmittal is required on all submittals until approved.

Columns 9, 20, 23, and 24. Cond. (Conditions): Columns to be used by any party for communicating status. Entries to be used as follows:

Sat. (Satisfactory). Item is complete, correct, and ready for installation. No further action is required.

Dmgd. (Damaged). Item was received or has been damaged and must either be returned for repair of repair parts requested and repairs made on-site.

Incp. (Incomplete). Item is missing component(s).

Wrng. (Wrong). Item does not agree with the "ACCEPTED" shop drawings and must be replaced with an acceptable item.

NA (Not Applicable). Self-explanatory.

EXAMPLE:

9,	20,	23,	24
Incp. components			Missing Ordered 11/14/85 Due site 12/18/85

As an Owner, Contractor, or Resident Engineer supplies Baxter & Woodman, Inc., with additional information, the data will be logged into the computer, the records, updated, and upon request, copies made and furnished to the interested party(ies). It is suggested that this document be monitored continuously and update information furnished to Baxter & Woodman, Inc., no less than bi-weekly.

The furnishing of the Shop Drawings (Computerized) printout by the Engineer is a gratuitous assistance and the Engineer does not thereby assume responsibility for errors or omissions. Where such errors or omissions are discovered later, they must be made good by the Contractor irrespective of any prior review by the Engineer.

SECTION 01 41 26

PERMITS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section describes permit requirements for building and dewatering wells.

1.2 BUILDING PERMITS

- A. Obtain all permits required, and pay all inspection fees for the respective work requiring such permits. Water Utility shall reimburse Contractor for all City inspection and permit fees.

1.3 TRENCH DEWATERING

- A. Conform with the Wisconsin Department of Natural Resources (WDNR) Construction Site Best Management Practice Handbook, Technical Standards, and WPDES permit requirements.

1.4 HIGH CAPACITY DEWATERING WELLS

- A. Obtain approval from the Wisconsin Department of Natural Resources (WDNR), Private Water Supply Section, Box 7921, Madison, WI 53707, for any well or systems of wells classified as a high capacity groundwater extraction system (maximum capacity in excess of 70 gallons per minute).
- B. Conform to the requirements of the Wisconsin Pollutant Discharge Elimination System (WPDES) as specified in Chapter 147 of the Wisconsin State Statutes for the discharge from a dewatering operation that could cause any adverse impact on the quality of the receiving water.
- C. Conform to the requirements of Chapter 30 of the Wisconsin State Statutes for the discharge from a dewatering operation that could scour or alter the banks or bed of navigable bodies of water or requires supports for discharge piping.

1.5 ENVIRONMENTAL PERMITS

- A. Conform with the requirements of the Wisconsin Department of Natural Resources (WDNR) permits.

END OF SECTION

PERMITS

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SECTION 01 42 13

ABBREVIATIONS AND ACRONYMS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section describes abbreviations referenced in the Contract Documents.

1.2 ABBREVIATIONS

A. Referenced Standards:

1. Where the Contract Documents reference any published specifications or standards of any organization or association, comply with the requirements of the specification or standards which are current on the date of Advertisement for Bids. In case of a conflict between the referenced specifications or standards, the one having the more stringent requirements shall govern.
2. In case of conflict between the referenced specifications or standards and the Contract Documents, the Contract Documents shall govern.

B. Abbreviations:

1. The following are definitions of abbreviations that may be used within the Project Manual:
 - AA - Aluminum Association
 - AASHTO - American Association of State Highway and Transportation Officials
 - ACI - American Concrete Institute
 - AISC - American Institute of Steel Construction
 - ANSI - American National Standard Institute
 - ASTM - American Society for Testing and Materials
 - AWG - American Wire Gauge
 - AWS - American Welding Society
 - AWWA - American Water Works Association
 - CBM - Certified Ballast Manufacturers Association
 - CRSI - Concrete Reinforcing Steel Institute
 - ICEA - Insulated Cable Engineers Association
 - IEEE - Institute of Electrical and Electronics Engineers, Inc.
 - ISA - Instrument Society of America
 - FS - Federal Specifications
 - NEC - National Electrical Code (NFPA 70)
 - NECA - National Electrical Contractors' Association
 - NEMA - National Electrical Manufacturer's Association
 - NFPA - National Fire Protection Association or National Forest Products Association
 - NSF - National Sanitation Foundation
 - OSHA - U.S. Department of Labor, Occupational Safety and Health Department
 - PS - United States Products Standards

ABBREVIATIONS AND ACRONYMS

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SSPC - Structural Steel Painting Council
UL - Underwriter's Laboratories, Inc.
WDOT - "STANDARD SPECIFICATIONS" - Wisconsin Department of
Transportation, "STANDARD SPECIFICATIONS For Highway and Structure
Construction"

END OF SECTION

SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section describes construction facilities and temporary controls required for the Work.
- B. Related work:
 - 1. Except that equipment furnished by subcontractors shall comply with requirements of pertinent safety regulations, such equipment normally furnished by the individual trades in execution of their own portions of the Work are not part of this Section.
 - 2. Permanent installation and hookup of the various utility lines are described in other Sections.

1.2 REQUIREMENTS

- A. Provide construction facilities and temporary controls needed for the Work including, but not necessarily limited to:
 - 1. Temporary utilities such as heat, water, electricity, and telephone.
 - 2. Field office for the Contractor's personnel.
 - 3. Temporary sanitary facilities.
 - 4. Enclosures such as fencing, tarpaulins, barricades, and canopies.
 - 5. Temporary fencing of the construction excavation.
 - 6. Fire extinguishers.
 - 7. Dust and mud control.
 - 8. Traffic control.
 - 9. Security.
 - 10. Right-of-way and property line control.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Maintain temporary facilities and controls in proper and safe condition throughout progress of the Work.

PART 2 - PRODUCTS

2.1 UTILITIES DURING CONSTRUCTION

- A. Water:
 - 1. The Owner will provide water for the initial filling for flushing and testing of new water main at no cost to the Contractor.
 - 2. Provide necessary temporary piping and water supply and, upon completion of the work, remove such temporary facilities.

- B. The Owner will provide water for use by the Contractor for miscellaneous construction activities. The Contractor will utilize water from devices provided by and at the location designated by the Owner. There will be no charge for the water utilized, but Contractor must coordinate the times of using water with the Owner.
- C. Electricity:
 - 1. Owner will provide and pay for minor electricity used in construction.
 - 2. Provide necessary temporary wiring and, upon completion of the Work, remove such temporary facility.
- D. Heating: Owner will provide and maintain heat normal building heating. Contractor will augment this as necessary for proper conduct of operations needed in the Work.
- E. Telephone:
 - 1. Contractor shall provide cellular phone contacts for their key staff.

2.2 FIELD OFFICES AND SHEDS

- A. Contractor's facilities:
 - 1. Provide a field office and sheds adequate in size and accommodation for Contractor's offices, supply, and storage.

2.3 SANITARY FACILITIES

- A. Provide temporary sanitary facilities meeting Federal, State, and local health department requirements.
 - 1. Maintain in a sanitary condition at all times.

2.4 ENCLOSURES

- A. Provide and maintain for the duration of construction all scaffolds, tarpaulins, canopies, warning signs, steps, platforms, bridges, and other temporary construction necessary for proper completion of the Work in compliance with pertinent safety and other regulations.

2.5 TEMPORARY FENCING

- A. Provide and maintain for the duration of excavation construction a temporary fence of design and type needed to prevent entry onto the Work by the public.
- B. Temporary work boundary fence (standard).
 - 1. Provide fence 36-inch to 48-inch in height.
 - a. Material: Polyethylene, PVC, or wood lath.
 - 2. Provide steel or wood posts.
 - a. Height: To support fence for total height after being driven.

2.6 FIRE EXTINGUISHERS

- A. Provide and maintain not less than two fire extinguishers, multi-purpose dry chemical type with UL rating of 4A-60 B:C, 10-pound capacity, Amerex Model ABC, or equal, enclosed in suitable protecting cabinets and conveniently located for proper protection.

PART 3 - EXECUTION

3.1 MAINTENANCE AND REMOVAL

- A. Maintain temporary facilities and controls as long as needed for safe and proper completion of the Work.
- B. Remove such temporary facilities and controls as rapidly as progress of the Work will permit, or as directed by the Engineer.

3.2 DUST AND MUD CONTROL

- A. Take necessary precautions to control dust and mud associated with the Work, subject to the approval of the Engineer.
 - 1. In dry weather, spray dusty areas daily with water in order to control dust.
 - 2. Apply calcium chloride having a minimum chemical content of 77 percent calcium chloride at an application rate of 3 pounds per square yard of surface covered at locations as directed by the Engineer.
- B. Take necessary steps to prevent the tracking of mud onto adjacent streets and highways.
 - 1. Remove mud resulting from the construction traffic from the adjacent streets and highways.

3.3 TRAFFIC CONTROL

- A. Protect and maintain traffic by the proper use of barricades, warning lights, flares, and necessary traffic control and safety devices, conforming to federal, state, and local regulations regarding their use.
- B. Use forms of traffic control on public roadways required by the construction operations in accordance with the latest revision of "Part IV, Traffic Controls for Construction and Maintenance Operations of the Wisconsin Manual on Uniform Traffic Control Devices", and Section 643, TRAFFIC CONTROL, of the WDOT "Standard Specifications".
- C. Unless the Contractor has obtained written permission from the Engineer to temporarily close any street, alley, or other traveled way, keep such traveled way open to traffic on the existing pavement.
- D. Maintain alternating one-way traffic from opposing directions during working hours. At all other times, provide sufficient width within existing shoulders or curbs to permit one lane of traffic in each direction.

- E. Ensure that all barricades, warning signs, lights, and other devices are operational 24 hours each day, including Sundays and holidays, during the time the contract is in force.
 - 1. In the event of severe weather conditions, provide any additional personnel necessary to properly maintain all traffic control devices.
- F. At the preconstruction meeting, furnish the name of the individual in the Contractor's direct employ who is to be responsible for the installation and maintenance of the traffic control for this project.
 - 1. If the actual installation and maintenance are to be accomplished by a Subcontractor, obtain the Engineer's consent at the time of the preconstruction meeting.
 - 2. The Owner will provide the Contractor with the name of its representative who will be responsible for the administration of the traffic control plan.
- G. Provide access to private driveways at all times except during pipeline installation across a driveway.
 - 1. Keep driveway closure times to an absolute minimum.
 - 2. Warn homeowners 24 hours in advance of a driveway closure, and again just prior to closing to allow homeowners to move their vehicles.
 - 3. Maintain access for emergency vehicles at all times.
- H. Provide access to commercial or industrial driveways at all times except during pipeline installation across a driveway.
 - 1. Keep driveway closure times to an absolute minimum.
 - 2. If two driveway entrances exist, keep one driveway open at all times.
 - 3. Establish schedule for driveway closures with commercial or industrial establishments that will not obstruct passage of employees or customers during heavy use period.
 - 4. Maintain access for emergency vehicles at all times.
- I. The costs for traffic control will be considered incidental to the Contract and no additional compensation will be allowed.

3.4 SECURITY

- A. Take whatever measures are necessary to protect the safety of the public, workmen, and materials.
 - 1. Provide inspection of work area daily.
 - 2. Provide the security of the site, both day and night.

3.5 RIGHT-OF-WAY AND PROPERTY LINE CONTROL

- A. Protect all right-of-way markers, property line iron pins, and easement line iron pins during construction.
 - 1. Flag such control points prior to construction and protect the points during the course of construction.
- B. Establish tie-down control for any right-of-way markers or iron pins that may be lost or damaged during the work.
- C. Re-establish any right-of-way markers or iron pins that are lost or damaged during construction, after completion of restoration work.

- D. Provide the services of a Registered Land Surveyor for replacement of lost markers and iron pins.
 - 1. The cost for this work will be considered incidental to the Contract, and no additional compensation will be allowed.

3.6 TEMPORARY FENCE

- A. Provide fence along edges of all excavation limits until excavation is filled.

END OF SECTION

SECTION 01 61 01

GENERAL EQUIPMENT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section describes the general equipment requirements applicable to all equipment and supplements the detailed equipment specifications.

1.2 SUBMITTALS

- A. Comply with pertinent provisions of Sections 01 33 01 and 01 78 26.
- B. Submit manufacturer's certificate of inspection, Contractor's verification of equipment inspection, and Contractor's equipment guarantee as specified herein.

PART 2 - PRODUCTS

2.1 LUBRICANTS

- A. Provide lubricants of the type recommended by the equipment manufacturer for each item of equipment in sufficient quantity for one year of normal operation and maintenance.
- B. Provide lubrication fittings readily accessible from the outside of all equipment without removing covers or guards.

2.2 SAFETY GUARDS

- A. Cover all drive belts, chains and couplings with suitable guard fabricated of 14 gauge or heavier steel designed for easy installation and removal, unless otherwise specified.

2.3 ANCHORS

- A. Provide the size and number of anchor bolts, mechanical anchors and adhesive anchors determined by the equipment manufacturer unless otherwise indicated on the Drawings.
- B. Provide Type 316 stainless steel anchor bolts, threaded rods, nuts, washers, mechanical anchors, adhesive anchors, and other fastener parts for installing equipment, complying with ASTM F593 and F594.

PART 3 - EXECUTION

3.1 SHOP ASSEMBLY AND MATCHMARKING

- A. Assemble, inspect, and test equipment in the manufacturer's shop as far as is practical.
- B. Provide accurate shopmarking and identification for items to be field erected in accordance with erection details furnished with the equipment.
- C. Provide all fasteners and miscellaneous small parts to be field erected individually packaged for shipment, and identify as to location in accordance with a schedule of fasteners with the equipment.

3.2 INSTALLATION, INSPECTION, TESTING AND OPERATOR INSTRUCTIONS

- A. Provide the services of a qualified serviceman from the manufacturer of each piece of equipment to:
 - 1. Inspect the equipment installation including alignment, clearances, field erection where applicable, and initial lubrication where applicable.
 - 2. Ascertain that the installation is properly completed.
 - 3. Instruct the Owner's personnel in the proper operation and maintenance of the equipment in accordance with the manufacturer's recommendations.
- B. Make all changes or adjustments that may be required for a complete and proper installation and operation.
- C. After the installation has been completed in accordance with the manufacturer's instructions and in the presence of the manufacturer's serviceman, test the equipment and its appurtenances for proper operating condition and for performance in accordance with these Specifications, subject to the Engineer's approval.
- D. Provide three (3) copies of the Manufacturer's Certificate of Inspection and the Contractor's Verification of Equipment Inspection to the Engineer certifying and verifying that the equipment and all appurtenances supplied with it have been installed in accordance with the manufacturer's recommendations and that the test operation was satisfactory.
 - 1. Use the form, Attachment 01 61 01-1.

3.3 EQUIPMENT GUARANTEE

- A. Guarantee all equipment, motors, electrical controls, and other mechanical devices to operate in accordance with the requirements of these Specifications and replace and repair any guaranteed item found to be defective within two

years, or longer period if specifically stated for any particular item, from the date of the Owner's acceptance for use of the equipment without additional expense to the Owner for labor or materials.

1. After obtaining Owner Authorized Representative's signature, provide three (3) copies of a Contractor's Equipment Guarantee to the Engineer, using the form, Attachment 01 61 01-2.

END OF SECTION

ATTACHMENT 01 61 01-1

MANUFACTURER'S CERTIFICATE OF INSPECTION

Date: _____
 Project: _____
 Contractor: _____
 Manufacturer: _____
 Equipment: _____

This will certify that I have completely checked and inspected the installation of this equipment and it has been properly installed in accordance with our instructions and requirements. I also certify that the equipment has been satisfactorily tested and is now ready for normal operation and use.

I have instructed the Owner's operator, _____, in the proper operation and maintenance of the equipment which we have furnished for this project.

 Manufacturer's Representative's Signature

 Name and Title

CONTRACTOR'S VERIFICATION OF EQUIPMENT INSPECTION

Date: _____
 Project: _____
 Contractor: _____
 Manufacturer: _____
 Equipment: _____

We, the Contractor for the subject project, hereby verify that the equipment manufacturer's serviceman has inspected and tested the installation of this equipment within the last 30 days and has certified that the equipment which we have furnished and installed for this project is now ready for normal operation and use by the Owner.

 Contractor's Representative's Signature

 Name and Title

ATTACHMENT 01 61 01-2

CONTRACTOR'S EQUIPMENT GUARANTEE

Date: _____

Project: _____

Contractor: _____

Manufacturer: _____

Equipment: _____

We, the Contractor for the subject project, hereby guarantee this equipment for a period of _____ years from the date of the Owner's acceptance and use of this equipment, and shall replace or repair the equipment or any parts thereof which become defective or do not function properly during normal operation and maintenance without any additional expense to the Owner for labor or materials.

Contractor's Representative's Signature

Name and Title

ACCEPTED this _____ day of _____, 20____, for Owner's use.

Owner's Representative's Signature

Name and Title

SECTION 01 62 01

PRODUCT OPTIONS AND SUBSTITUTIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section describes product options available to bidders and the Contractor, plus procedures for securing approval of proposed substitutions.

1.2 PRODUCT OPTIONS

- A. The Contract is based on standards of quality established in the Contract Documents.
1. In agreeing to the terms and conditions of the Contract, the Contractor has accepted a responsibility to verify that the specified products will be available and to place orders for all required materials in such a timely manner as is needed to meet his agreed construction schedule.
 2. Neither the Owner nor the Engineer has agreed to the substitution of materials or methods called for in the Contract Documents, except as they may specifically otherwise state in writing.
- B. Materials and/or equipment specified by name:
1. Where materials and/or equipment are specified by naming one single manufacturer and/or model number, followed by words that indicate no substitution is permitted, only the material and/or equipment named is approved for incorporation into the Work.
 2. Should the Contractor demonstrate to the approval of the Engineer that a specified material or method was ordered in a timely manner and will not be available in time for incorporation into this Work, the Contractor shall submit to the Engineer such data on proposed substitute materials and/or equipment as are needed to help the Engineer determine suitability of the proposed substitution.
- C. Where materials and/or equipment are specified by name and/or model number, followed by the words "or equal":
1. The material and/or equipment specified by name establishes the required standard of quality.
 2. Materials and/or equipment proposed by the Contractor to be used in lieu of materials and/or equipment so specified by name shall in all ways equal or exceed the qualities of the named materials and/or equipment.
 - a. The Engineer will evaluate the proposed alternate major equipment and materials as "substitute" items.

3. Non-major equipment: The Contractor may propose "substitute" or "or equal" items for non-major equipment in accordance with Paragraph 6.05 of the EJCDC General Conditions.
 - a. If in the Engineer's sole discretion an item of material or equipment proposed by the Contractor does not qualify as an "or equal" item, the Engineer will notify the Contractor in writing that the item will be considered as a "substitute" item. If the Contractor wishes for the Engineer to continue the evaluation, the Contractor shall submit additional information in accordance with Paragraph 6.05.A.2 of the EJCDC General Conditions.
 4. The Engineer will record all time used by the Engineer to evaluate proposed substitute items. Owner will reimburse the Engineer at the Engineer's standard hourly rate for all time spent evaluating proposed substitute items and deduct such costs from payments due the Contractor. Costs associated with review of proposed "or equal" items will not be charged to the Contractor.
- D. Products specified by reference to standard specifications such as ASTM and similar standards do not require submittal except for interface within the Work.

1.3 DELAYS

- A. Delays in construction arising by virtue of the non-availability of a specified material and/or method will not be considered by the Engineer as justifying an extension of the agreed Contract Time.

END OF SECTION

SECTION 01 66 11

STORAGE AND PROTECTION OF MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Protect products scheduled for use in the Work by means including, but not necessarily limited to, those described in this Section.
- B. Related work:
 - 1. Additional procedures also may be prescribed in other Sections of these Specifications.

1.2 QUALITY ASSURANCE

- A. Include within the Contractor's quality assurance program such procedures as are required to assure full protection of work and materials.

1.3 MANUFACTURERS' RECOMMENDATIONS

- A. Except as otherwise approved by the Engineer, determine and comply with manufacturers' recommendations on product handling, storage, and protection.

1.4 PACKAGING

- A. Deliver products to the job site in their manufacturer's original container, with labels intact and legible.
 - 1. Maintain packaged materials with seals unbroken and labels intact until time of use.
 - 2. Promptly remove damaged material and unsuitable items from the job site, and promptly replace with material meeting the specified requirements, at no additional cost to the Owner.
- B. The Engineer may reject as non-complying such material and products that do not bear identification satisfactory to the Engineer as to manufacturer, grade, quality, and other pertinent information.

1.5 STORAGE AND PROTECTION

- A. Comply with Section 01 14 11 for Contractor's storage area.
- B. Comply with the requirements of this Section for off-site storage.
 - 1. The Engineer reserves the right to inspect the off-site storage areas.

- C. Store equipment and materials in accordance with the manufacturer's instructions.
- D. Provide temporary weather-tight enclosures to protect products from damage by the elements.
- E. Protect finished surfaces through which equipment and materials are handled.
- F. Provide protection for finished floor surfaces in traffic areas prior to allowing equipment or materials to be moved over such surfaces.
- G. Maintain finished surfaces clean, unmarred, and suitably protected until accepted by the Owner.
- H. Do not store plant maintenance equipment, furniture, and laboratory equipment on site until they are needed by the Owner or for progress of work.

1.6 REPAIRS AND REPLACEMENTS

- A. In event of damage, promptly make replacements and repairs to the approval of the Engineer and at no additional cost to the Owner.
- B. Additional time required to secure replacements and to make repairs will not be considered by the Engineer to justify an extension in the Contract Time of Completion.

END OF SECTION

SECTION 01 73 29
CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section establishes general requirements pertaining to cutting (including excavating), fitting, and patching of the Work required to:
 - 1. Make the several parts fit properly.
 - 2. Uncover work to provide for installing, inspecting, or both, of ill-timed work.
 - 3. Remove and replace work not conforming to requirements of the Contract Documents.
 - 4. Remove and replace defective work.

- B. Related work:
 - 1. In addition to other requirements specified, upon the Engineer's request uncover work to provide for inspection by the Engineer of covered work, and remove samples of installed materials for testing.
 - 2. Do not cut or alter work performed under separate contracts without the Engineer's written permission.

1.2 SUBMITTALS

- A. Request for Engineer's consent:
 - 1. Prior to cutting which affects structural safety, submit written request to the Engineer for permission to proceed with cutting.
 - 2. Should conditions of the Work, or schedule, indicate a required change of materials or methods for cutting and patching, so notify the Engineer and secure his written permission and the required Change Order prior to proceeding.

- B. Notices to the Engineer:
 - 1. Prior to cutting and patching performed pursuant to the Engineer's instructions, submit cost estimate to the Engineer. Secure the Engineer's approval of cost estimates and type of reimbursement before proceeding with cutting and patching.
 - 2. Submit written notice to the Engineer designating the time the Work will be uncovered, to provide for the Engineer's observation.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. For replacement of items removed, use materials complying with pertinent Sections of these Specifications.

2.2 PAYMENT FOR COSTS

- A. The Owner will reimburse the Contractor for cutting and patching performed pursuant to a written Change Order, after claim for such reimbursement is submitted by the Contractor. Perform other cutting and patching needed to comply with the Contract Documents at no additional cost to the Owner.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Inspection:
 - 1. Inspect existing conditions, including elements subject to movement or damage during cutting, excavating, patching, and backfilling.
 - 2. After uncovering the work, inspect conditions affecting installation of new work.
- B. Discrepancies:
 - 1. If uncovered conditions are not as anticipated, immediately notify the Engineer and secure needed directions.
 - 2. Do not proceed until unsatisfactory conditions are corrected.

3.2 PREPARATION PRIOR TO CUTTING

- A. Provide required protection including, but not necessarily limited to, shoring, bracing, and support to maintain structural integrity of the Work.

3.3 PERFORMANCE

- A. Perform required excavating and backfilling as required under pertinent other Sections of these Specifications.
- B. Perform cutting and demolition by methods which will prevent damage to other portions of the Work and provide proper surfaces to receive installation of repair and new work.
- C. Perform fitting and adjusting of products to provide finished installation complying with the manufacturer's recommendations for specified equipment, products, tolerances, and finishes.

- D. Perform slight alterations needed to make adjustable parts fit to fixed parts to provide a complete installation.
- E. Refinish surfaces as necessary to match adjacent finishes.

END OF SECTION

SECTION 01 74 23

FINAL CLEANING

PART 1 - GENERAL

1.1 SUMMARY

- A. Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this Section.
- B. Related work:
 - 1. In addition to standards described in this Section, comply with requirements for cleaning as described in other pertinent Sections of these Specifications.

1.2 QUALITY ASSURANCE

- A. Conduct daily inspection, and more often if necessary, to verify that requirements for cleanliness are being met.
- B. In addition to the standards described in this Section, comply with pertinent requirements of governmental agencies having jurisdiction.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS AND EQUIPMENT

- A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.2 COMPATIBILITY

- A. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

- A. General:
 - 1. Retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.

2. Do not allow accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
3. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the job site.
4. Provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the environment.

B. Site:

1. Daily, and more often if necessary, inspect the site and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
2. Weekly, and more often if necessary, inspect all arrangements of materials stored on the site. Restack, tidy, or otherwise service arrangements to meet the requirements of Paragraph 3.1 A. 1. above.
3. Maintain the site in a neat and orderly condition at all times.

C. Structures:

1. Weekly, and more often if necessary, inspect the structures and pick up all scrap, debris, and waste material. Remove such items to the place designated for their storage.
2. Weekly, and more often if necessary, sweep interior spaces clean.
 - a. "Clean," for the purpose of this subparagraph, shall be interpreted as meaning free from dust and other material capable of being removed by use of reasonable effort and a hand-held broom.
3. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.
4. Following the installation of finish floor materials, clean the finish floor daily (and more often if necessary) at all times while work is being performed in the space in which finish materials are installed.
 - a. "Clean," for the purpose of this subparagraph, shall be interpreted as meaning free from foreign material which, in the opinion of the Engineer, may be injurious to the finish floor material.

3.2 FINAL CLEANING

- A. "Clean," for the purpose of this Article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.
- B. Prior to completion of the Work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning

as described in Paragraph 3.1 above.

- C. Site:
 - 1. Unless otherwise specifically directed by the Engineer, broom clean paved areas on the site and public paved areas adjacent to the site.
 - 2. Completely remove resultant debris.

- D. Structures:
 - 1. Exterior:
 - a. Visually inspect exterior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
 - b. Remove all traces of splashed materials from adjacent surfaces.
 - c. If necessary to achieve a uniform degree of cleanliness, hose down the exterior of the structure.
 - d. In the event of stubborn stains not removable with water, the Engineer may require light sandblasting or other cleaning at no additional cost to the Owner.
 - 2. Interior:
 - a. Visually inspect interior surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter.
 - b. Remove all traces of splashed material from adjacent surfaces.
 - c. Remove paint droppings, spots, stains, and dirt from finished surfaces.
 - 3. Glass: Clean inside and outside.
 - 4. Polished surfaces: To surfaces requiring routine application of buffed polish, apply the polish recommended by the manufacturer of the material being polished.

- E. Schedule final cleaning as approved by the Engineer to enable the Owner to accept a completely clean Work.

3.3 CLEANING DURING OWNER'S OCCUPANCY

- A. Should the Owner occupy the Work or any portion thereof prior to its completion by the Contractor and acceptance by the Owner, responsibilities for interim and final cleaning shall be as determined by the Engineer in accordance with the General Conditions of the Contract.

END OF SECTION

SECTION 01 77 01
CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section describes an orderly and efficient transfer of the completed Work to the Owner.
- B. Related work:
 - 1. Activities relative to Substantial Completion and Contract closeout are described in the EJCDC General Conditions.

1.2 QUALITY ASSURANCE

- A. Prior to requesting that the Engineer issue a certificate of Substantial Completion in accordance with Paragraph 14.04 or 14.05 of the EJCDC General Conditions, use adequate means to assure that the Work is completed in accordance with the specified requirements and is ready for a joint inspection by Owner, Contractor, and Engineer.

1.3 PROCEDURES

- A. Substantial Completion:
 - 1. Prepare the list required by Paragraph 14.04.A of the EJCDC General Conditions and submit it along with a written request that Engineer issue a certificate of Substantial Completion.
 - 2. Within a reasonable time after receipt of the list, Owner, Contractor, and Engineer will jointly inspect the Work to determine status of completion.
 - 3. Should the Engineer determine that the Work is not substantially complete:
 - a. The Engineer will so notify the Contractor, in writing, giving the reasons therefore.
 - b. Remedy the deficiencies and notify the Engineer when ready for re-inspection.
 - c. Owner, Contractor, and Engineer will re-inspect the Work.
 - 4. When the Engineer concurs that the Work is substantially complete:
 - a. The Engineer will prepare a tentative "Certificate of Substantial Completion," accompanied by the Contractor's list of items to be completed or corrected, as verified by the Engineer.
 - b. The Engineer will submit the tentative Certificate to the Contractor for acceptance.
 - c. After Contractor signs and returns the tentative Certificate to Engineer, Engineer will submit the tentative Certificate to Owner

accompanied by a tentative list of items to be completed or corrected before final payment.

d. Owner will have seven days after receipt of the tentative Certificate during which to make objection to Engineer as to any provisions of the Certificate on attached list.

(1) If Owner objects, Engineer will consider Owner's objections. If, after considering Owner's objections, Engineer concludes that the Work is not substantially complete, Engineer will, within fourteen days after submission of the tentative Certificate to Owner, notify Contractor in writing, stating reasons therefor. If, after considering Owner's objections, Engineer considers the Work substantially complete, Engineer will within said fourteen days execute and deliver to Owner and Contractor, a definitive Certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative Certificate as Engineer believes justified after consideration of any objections of Owner.

(2) If Owner has no objections, Engineer will within fourteen days after submission of the tentative Certificate to Owner and Contractor issue a definitive Certificate of Substantial Completion.

e. At the time of delivery of the tentative Certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, maintenance, heat, utilities, insurance, warranties, and guarantees. Unless Owner or Contractor advise the Engineer in writing of any objections within seven days after delivery of the tentative Certificate of Substantial Completion, the Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

B. Final Completion:

1. Prepare and submit the notice required by the first sentence of Paragraph 14.06.A of the General Conditions.
2. Verify that the Work is complete including, but not necessarily limited to, the items mentioned in Paragraph 14.07.A of the EJCDC General Conditions.
3. Certify that:
 - a. Contract Documents have been reviewed.
 - b. Work has been inspected for compliance with the Contract Documents.
 - c. Work has been completed in accordance with the Contract Documents.

- d. Equipment and systems have been tested as required, and are operational.
 - e. Work is completed and ready for final inspection.
 4. Owner, Contractor, and Engineer will make a joint inspection to verify status of completion.
 5. Should the Engineer determine that the Work is incomplete or defective:
 - a. The Engineer will so notify the Contractor, in writing, listing the incomplete or defective work.
 - b. The Contractor will remedy the deficiencies promptly, and notify the Engineer when ready for re-inspection.
 6. When the Engineer determines that the Work is acceptable under the Contract Documents, he will request the Contractor to make closeout submittals.
- C. Closeout submittals include, but are not necessarily limited to:
1. Project Record Documents described in Section 01 78 39.
 2. Manufacturer's Certificate of Inspection, Contractor's Verification of Equipment Inspection, and Contractor's Equipment Guarantee for each item of equipment as required in Section 01 61 01.
 3. Warranties and bonds.
 4. Keys and keying schedule.
 5. Spare parts and materials extra stock.
 6. Evidence of compliance with requirements of governmental agencies having jurisdiction including, but not necessarily limited to:
 - a. Certificates of Inspection.
 - b. Certificates of Occupancy.
 7. Certificates of Insurance for products and completed operations;
 8. Evidence of payment and release of liens; and
 9. Affidavit of Compliance with Prevailing Wage Rate Determination and Affirmative Action requirements.
 10. List of subcontractors, service organizations, and principal vendors, including names, addresses, and telephone numbers where they can be reached for emergency service at all times including nights, weekends, and holidays.
- D. Final adjustment of accounts:
1. Submit a final statement of accounting to the Engineer, showing all adjustments to the Contract Price.
 2. If so required, the Engineer will prepare a final Change Order showing adjustments to the Contract Price which have not been made by previous Change Orders.

END OF SECTION

CONTRACT CLOSEOUT
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SECTION 01 78 26

OPERATION AND MAINTENANCE MANUAL

PART 1 - GENERAL

1.1 SUMMARY

- A. To aid the continued instruction of operating and maintenance personnel, and to provide a positive source of information regarding products incorporated into the Work, furnish and deliver the manuals described in pertinent Sections of these Specifications.

1.2 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 01.
- B. Submit two electronic and three paper copies of the required manuals for each item of equipment to the Engineer no later than 30 days following the Engineer's approval of shop drawings for said item of equipment.

1.3 QUALITY ASSURANCE

- A. Use only personnel who are thoroughly trained and experienced in operation and maintenance of the described items, completely familiar with the requirements of this Section, and skilled in technical writing to the extent needed for communicating the essential data.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE MANUALS

- A. Where operation and maintenance manuals are required to be submitted under other Sections of these Specifications, prepare in accordance with the provisions of this Section.
- B. Format:
 - 1. Size: 8-1/2" x 11".
 - 2. Paper: White bond, at least 20 lb weight.
 - 3. Text: Neatly written or printed.
 - 4. Drawings: 11" in height preferable; bind in with text; foldout acceptable; larger drawings acceptable but fold to fit within the manual and provide a drawing pocket inside rear cover or bind in with text.
 - 5. Flysheets: Separate each portion of the manual with neatly prepared flysheets briefly describing contents of the ensuing portion; flysheets

- may be in color.
6. Binding: Use heavy-duty plastic or fiberboard covers with binding mechanism concealed inside the manual; 3-ring binders will be acceptable.
 7. Measurements: Provide all measurements in U.S. standard units such as feet-and-inches, lbs, and cfm; where items may be expected to be measured within ten years in accordance with metric formulas, provide additional measurements in the "International System of Units" (SI).
- C. Provide front and back covers for each manual, using durable material, and clearly identified on or through the cover with at least the following information:

OPERATING AND MAINTENANCE MANUALS

()
(Name and address of Work)
()
(name of Contractor)
()
(general subject of this Manual)
()
(Engineer, and approval date)

- D. Contents: Include at least the following:
1. Neatly typewritten index near the front of the manual, giving immediate information as to location within the manual of all emergency information regarding the installation.
 2. Complete instructions regarding operation and maintenance of all equipment involved including lubrication, disassembly, and reassembly.
 3. Complete nomenclature of all parts of the equipment.
 4. Complete nomenclature and part number of all replaceable parts, name and address of nearest vendor, and all other data pertinent to procurement procedures.
 5. Manufacturers' bulletins, cuts, and descriptive data, where pertinent, clearly indicating the precise items included in this installation and deleting, or otherwise clearly indicating, all manufacturers' data with which this installation is not concerned.
 6. Such other data as required in pertinent other Sections of these Specifications.

PART 3 - EXECUTION

3.1 TIMING AND PAYMENT

- A. Make submittals far enough in advance of scheduled dates for equipment installation to provide at least ten (10) working days for review by the Engineer following the Engineer's receipt of the submittal.
- B. Payment for the fabrication, delivery, or installation of any equipment will be withheld until the Engineer has received the required operation and maintenance manual(s).

END OF SECTION

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Throughout progress of the Work, maintain an accurate record of changes in the Contract Documents, as described in Paragraph 3.1 below and, upon completion of the Work, submit the recorded changes as described in Paragraph 3.2 below.
- B. Related work:
 - 1. Other requirements affecting Project Record Documents may appear in pertinent other Sections of these Specifications.

1.2 SUBMITTALS

- A. Comply with pertinent provisions of Section 01 33 01.
- B. The Engineer's approval of the current status of Project Record Documents may be a prerequisite to the Engineer's approval of requests for progress payment and request for final payment under the Contract.
- C. Prior to submitting each request for progress payment, secure the Engineer's approval of the current status of the Project Record Documents.
- D. Prior to submitting request for final payment, submit the final Project Record Documents to the Engineer and secure his approval.

1.3 QUALITY ASSURANCE

- A. Delegate the responsibility for maintenance of Record Documents to one person on the Contractor's staff as approved by the Engineer.
- B. Accuracy of records:
 - 1. Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of Specifications and each sheet of Drawings and other Documents where such entry is required to show the change properly.
 - 2. Accuracy of records shall be such that future search for items shown in the Contract Documents may rely reasonably on information obtained from the approved Project Record Documents.

PROJECT RECORD DOCUMENTS

01 78 39-1 (120851.40)

- C. Make entries within 24 hours after receipt of information that the change has occurred.
- D. Do not conceal any work until the required information is recorded.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Maintain the job set of Record Documents completely protected from deterioration and from loss and damage until completion of the Work and transfer of all recorded data to the final Project Record Documents.
- B. In the event of loss of recorded data, use means necessary to again secure the data to the Engineer's approval.
 - 1. Such means shall include, if necessary in the opinion of the Engineer, removal and replacement of concealing materials.
 - 2. In such case, provide replacements to the standards originally required by the Contract Documents.

PART 2 - PRODUCTS

2.1 RECORD DOCUMENTS

- A. Job set: Promptly following receipt of the Owner's Notice to Proceed, secure from the Engineer at no charge to the Contractor one complete set of all Documents comprising the Contract.

PART 3 - EXECUTION

3.1 MAINTENANCE OF JOB SET

- A. Immediately upon receipt of the job set described in Paragraph 2.1 A. above, identify each of the Documents with the title, "RECORD DOCUMENTS - JOB SET".
- B. Preservation:
 - 1. Considering the Contract completion time, the probable number of occasions upon which the job set must be taken out for new entries and for examination, and the conditions under which these activities will be performed, devise a suitable method for protecting the job set.
 - 2. Do not use the job set for any purpose except entry of new data and for review by the Engineer.
 - 3. Maintain the job set at the site of Work where designated by the Engineer.
- C. Making entries on Drawings:

1. Using an erasable colored pencil (not ink or indelible pencil), clearly describe the change by graphic line and note as required.
 2. Date all entries.
 3. Call attention to the entry by a "cloud" drawn around the area or areas affected.
 4. In the event of overlapping changes, use different colors for the overlapping changes.
- D. Make entries in the pertinent other Documents as approved by the Engineer.
- E. Conversion of schematic layouts:
1. In some cases on the Drawings, arrangements of conduits, circuits, piping, ducts, and similar items, is shown schematically and is not intended to portray precise physical layout.
 - a. Final physical arrangement is determined by the Contractor, subject to the Engineer's approval.
 - b. However, design of future modifications of the facility may require accurate information as to the final physical layout of items which are shown only schematically on the Drawings.
 2. Show on the job set of Record Drawings, by dimension accurate to within one inch, the centerline of each run of items such as are described in Paragraph 3.1 E. 1. above.

3.2 REVIEW AND SUBMITTAL

- A. Submit the completed set of Project Record Documents to the Engineer as described in Paragraph 1.2 D. above.
- B. Participate in review meetings as required.
- C. Make required changes and promptly deliver the final Project Record Documents to the Engineer.

3.3 CHANGES SUBSEQUENT TO ACCEPTANCE

- A. The Contractor has no responsibility for recording changes in the Work subsequent to Final Completion, except for changes resulting from work performed under Warranty.

END OF SECTION

SECTION 01 91 58
FACILITY START-UP

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section describes the Contractor's general equipment requirements for facility start-up.

1.2 SUBMITTALS

- A. Submit a detailed plan and schedule for start-up of the facility at least thirty (30) days prior to the scheduled start-up of the facility.

PART 2 - PRODUCTS

No products are required in this Section.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REQUIREMENTS

- A. In addition to the services required to comply with Section 01 61 01, Articles 3.2 and 3.3, provide the services of a qualified and experienced factory employed field service engineer from each equipment manufacturer:
 - 1. Ascertain that equipment has been installed in accordance with the manufacturer's recommended procedures.
 - 2. Ascertain that equipment is operational and ready for start-up.
 - 3. Make necessary repairs, corrections, and/or modifications prior to the scheduled start-up.
- B. Coordinate efforts of various equipment field service engineers with construction activities including painting and facility disinfection.
 - 1. Complete painting of equipment containing process water prior to disinfection.
 - 2. Successfully complete facility disinfection prior to start-up in accordance with appropriate provisions of AWWA C-653.
- C. Perform the above services at least two weeks prior to the scheduled start-up.
- D. Perform the facility start-up procedures in the presence of the Owner and Engineer.

- E. Operate the facility without problems for a period of fourteen (14) consecutive days prior to Owner's acceptance of the facility.

END OF SECTION

SECTION 02 41 53

DEMOLITION, REMOVAL AND ABANDONMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section describes demolition and removal of structures and parts of structures, removal of above grade and underground improvements, and abandonment of underground structures and pipelines as shown on the Drawings and specified in this Section.

1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

1.7 DEFINITIONS

- A. Demolish – Raze and dispose of above grade structures; including, but not limited to walls, roofs, ceilings, and ground floor slabs and floors. Raze and dispose of all equipment, piping and plumbing, electrical and communications

conduit, wires and cables, furniture, furnishings, windows, and doors in above grade and below grade structures.

- B. Remove – Excavate structure foundations, tanks, underground pipes, etc. in their entirety.
- C. Dispose – Transport or haul materials and equipment of any and all types to off-site location(s).
- D. Abandon – Remove structure foundations, tanks, and underground pipes, etc within the following limits
 - 1. 5 feet horizontally from any proposed structure or pipe, and
 - 2. 3 feet vertically below the proposed finished grade or the outside edges of any proposed structure or pipe.
 - 3. This work includes breaking up of below grade foundation slabs and sealing of underground pipes with mechanical plugs and/or concrete plugs.
- E. Salvage – Carefully remove intact for future use by Owner. Includes all Utility disconnections, capping, safe handling and transporting to Owner's facility at 119 E. Olin Avenue.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide materials, not specifically described but required for proper completion of the work of this Section, as selected by the Contractor subject to the approval of the Engineer.
- B. Grout for filling of abandoned pipes and structures:
 - 1. Cellular grout:
 - a. Low density cellular concrete capable of being mixed on site and pumped into place through a 2-inch hose.
 - b. Foaming agent complying with ASTM C869.
 - c. Portland Cement: ASTM C150, Type I or Type II.
 - d. Contents: Cement, fly ash, water and foaming agent.
 - e. Minimum net density: 70 pcf.
 - f. Acceptable manufacturer:
 - (1) Mearl Geofam Liquid Concentrate.
 - (2) Or equal.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PROTECTION

- A. Protect existing utilities indicated or made known.
- B. Protect trees and shrubs, where indicated to remain, by plank wrappers securely wired in place or by providing a fence around the tree or shrub of sufficient distance away and of sufficient height so trees and shrubs will not be damaged in any way as part of this Work.
 - 1. Do not permit any equipment to operate within 5 feet of any trees or shrubs that are to remain or in a manner as to harm overhanging branches.
- C. Protection of persons and property:
 - 1. Barricade open depressions and holes occurring as part of this Work, and post warning lights on property adjacent to or with public access.
 - 2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
 - 3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by operations under this Section.
- D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.
- E. Maintain access to the site at all times.

3.3 DEMOLITION

- A. General:
 - 1. By careful study of the Contract Documents and visiting the site, determine the location and extent of demolition to be performed.
 - 2. In all activities, comply with pertinent regulations of governmental agencies having jurisdiction.
- B. Demolition of existing structures:
 - 1. Demolish and remove existing structures, piping and equipment or parts thereof in a manner such as not to damage corresponding items which are to remain.

2. In those areas in which structures or piping to be demolished and removed now occupy space to be used for proposed structures, remove the existing structure or piping in total unless other instructions are included on the Drawings.

C. Existing equipment:

1. Existing mechanical or electrical equipment, miscellaneous metals, pipe, fittings, valves, furniture, cabinets, and other materials of reusable nature are considered salvage and shall remain, the property of the Owner.

3.4 ABANDONMENT OF STRUCTURES AND PIPING

A. Structures:

1. In those areas where structures do not now occupy space to be used for proposed structures, remove structures to a depth of not less than 3 feet below finished grade.
2. Break up or core hole slab portions of structures which may remain in part as specified above and fill voids with granular materials.
3. Plug piping which may remain in part as specified above with concrete for a distance of not less than 12 inches from the end of the pipe to remain in place.

B. Water Systems:

1. Abandon water mains indicated on the Drawings as "to be abandoned" only after all requirements for testing and disinfection have been satisfied and all existing services have been connected to new water mains.
2. Provide concrete plugs in all water main pipes to be abandoned at the limits of the trench excavations, or at other locations if so indicated by the Drawings.
3. Provide ductile iron plugs, caps, or other necessary fittings, and thrust blocking, on ends of portions of existing water mains that are to remain in service.
4. Close existing water valves only with the permission of the Engineer.
5. Remove valves and valve boxes and fill excavations with compacted granular material.
5. Remove valves and valve vaults to top of pipe and backfill with compacted granular material.
6. Remove fire hydrants in total, including auxiliary valves and boxes, and backfill excavations with compacted granular material.
7. Deliver valves, valve boxes, fire hydrants, and frames and grates to the Owner's Public Works Department.
8. Where abandonment of existing water mains or appurtenances require work outside of the work zone, restore area of work as indicated on the Drawings or Sections 32 10 00.13 and 32 92 00.13 of the Specifications.

9. Removal of existing water mains being replaced by new water mains in the same location is considered incidental to the installation of the new water main and no additional compensation will be allowed.

3.5 DISPOSAL

- A. General:
 - 1. Dispose of all debris from demolition work.
 - 2. Dispose away from the site in a legal manner.
 - 3. Do not store or accumulate debris at the job site.
- B. Do not burn debris at the site.
- C. Prepare documentation identifying the hauler, generator, place of origin of debris or soil, the weight or volume of debris or soil, and the location, owner, and operator of the facility where debris or soil was transferred, disposed, recycled or treated. Maintain documentation for three years.

3.6 UTILITIES

- A. Coordinate with utility companies and agencies as required.
- B. Where utility cutting, capping, or plugging is required, pay utility company to do the work, or perform such work in accordance with requirements of the utility company or governmental agency having jurisdiction.

END OF SECTION

SECTION 03 30 00
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide cast-in-place concrete, including formwork and reinforcement, as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
 - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
 - 1. Prior to placing concrete on the project, submit the following to the Engineer for approval:
 - a. Testing laboratory reports for each proposed concrete mix, design proportions and sieve analysis, and soundness tests for fine and coarse aggregates.
 - b. Test results for strength, slump, and entrained air content in accordance with the latest requirements of ASTM-C39 and ASTM-C192 on trial mix or field-testing records completed within previous 24 months. Perform strength tests on two test cylinders after 7 days curing and on two cylinders after 28 days curing.
 - c. Evidence of compliance with ASTM specifications for materials proposed to be used in the concrete mix.
 - d. Detailed reinforcing bar fabrication drawings prepared in accordance with ACI 315 including location of bar splices proposed by the Contractor in addition to those shown on the Drawings.
 - e. Casting plan indicating the location of construction joints which are proposed by the Contractor in addition to those shown on the Drawings.
 - 2. Submit, within 10 days of testing, duplicate copies of each laboratory report for concrete tests on samples taken at the jobsite, including the following information in each test report:
 - a. Project name.
 - b. Description of concrete work.
 - c. Quantity of concrete placed.
 - d. Dates of samples and testing.
 - e. Slump.
 - f. Total air content.
 - g. Compressive strength.
 - h. Air temperature at time of sampling.
 - 3. Submit manufacturer's data to prove compliance with the specifications for the following products:

- a. Non-shrink grout.
 - b. Waterstops.
 - c. Rubber waterstops.
 - d. Epoxy adhesive.
- B. Operation and Maintenance Manuals – None Required.
 - C. Certificates and Guarantees – None Required.
 - D. Lubricants – None Required.
 - E. Spare Parts – None Required.
 - F. Comply with pertinent provisions of Section 01 33 01.

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Comply with "Specifications for Structural Concrete for Buildings," ACI 301, except as may be modified herein.
- C. Provide access for, and cooperate with, the inspector and testing.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.
- B. Provide proper storage for reinforcing steel at the project site, including protective covering and blocking to keep steel off the ground.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 FORMS

- A. Use smooth, clean plywood or metal lined panels in good condition for forming exposed concrete surfaces including interior and exterior walls, beams, columns, and slabs. Coat the forms with a non-staining, non-reactive mineral oil.
- B. Use form liners for exposed ceilings.
- C. Provide 3/4-inch chamfers on exposed corners.

- D. When reusing lumber for formwork, remove nails, thoroughly clean, and fill and finish holes to produce smooth concrete surfaces free of defects.
- E. Provide temporary openings at the base of column and wall forms and elsewhere as required to facilitate cleaning and final inspection prior to concrete placement.
- F. Use form ties that will break off at least one inch behind the exposed concrete surface and not leave a hole larger than one inch in diameter. Do not use wire form ties.

2.2 REINFORCEMENT

- A. Comply with the following:
 - 1. Bars: Deformed billet steel conforming to ASTM A615, grade 60, unless otherwise shown on the Drawings.
 - 2. Welded wire reinforcement: Sheets of longitudinal and transverse cold drawn smooth steel wires electrically welded together at intersections, conforming to ASTM A185.
 - 3. Tie wire: 16 gauge annealed steel wire.
- B. Fabricate reinforcement in accordance with the latest provisions of ACI 318 "Building Code Requirements for Structural Concrete".
- C. Shop fabricate bars by cold bending to the dimensions and shapes shown on the detail shop drawings unless otherwise shown on the Drawings or approved by the Engineer.
- D. Use bars that are free from paint, oil, dirt, scale, or excessive rust which will destroy or reduce the bond when embedded in concrete.

2.3 CONCRETE

- A. Comply with the following:
 - 1. Portland cement: ASTM C150, Type I.
 - 2. Aggregate, general:
 - a. ASTM C33, uniformly graded and clean;
 - b. 35 to 50 percent ratio of fine aggregate to total aggregate by weight of surface dry materials.
 - 3. Aggregate, coarse: Pass a 1.500-inch sieve.
 - 4. Aggregate, fine: Pass a 0.375-inch sieve.
 - 5. Water: Fresh, clean, and free of oils, acids, alkalies, organic matter and deleterious substances.
- B. Provide concrete with the following properties:
 - 1. Minimum 28-day compressive strength: 4000 psi.
 - 2. Maximum water-cement ratio: 0.45 by weight.
 - 3. Minimum cement content: 520 pounds per cubic yard.
 - 4. Minimum slump: 1-inch.
 - 5. Maximum slump:

- a. 3 inches for footings.
 - b. 4 inches for slabs, walls, beams, girders, and columns.
- C. Use air-entrained concrete except where a smooth steel trowel finish is required. Provide a total air content of 4 to 6 percent by volume.

2.4 GROUT

- A. Grout for non-structural fillets: One part Portland Cement, three parts fine aggregate, and sufficient water to obtain a consistency for easy placing and finishing.
- B. Non-shrink grout: Pre-mixed, non-shrink, non-metallic, high density, high strength grout mixture of well graded silica aggregate and blended cements formulated in compliance with the U.S. Corps of Engineers' Specification CRD C-621.

2.5 CONCRETE ADMIXTURES

- A. Air-entraining admixtures:
- 1. Conform to the latest requirements of ASTM C260.
- B. Water reducing admixtures:
- 1. Conform to the latest requirements of ASTM C494.
 - 2. Type A (normal setting type) for all concrete.
 - 3. Type D (retarding setting type) or Type E (accelerating setting type) when approved by the Engineer.
- C. Fly ash admixtures (when approved by the Engineer):
- 1. Maximum sulfur trioxide content: 5 percent.
 - 2. Maximum loss of ignition: 5 percent.
- D. Do not add calcium chloride, salts, or chemical antifreeze compounds to concrete.

2.6 EPOXY ADHESIVE

- A. Provide a cartridge type, two-component, high solids epoxy adhesive system dispensed and mixed through a static mixing nozzle supplied by the manufacturer for use in anchoring threaded rod and reinforcing bars.
- B. Furnish material suitable for anchorage of threaded rods and reinforcing bars in cracked and uncracked concrete to resist long-term sustained loading, tested and qualified in accordance with the International Code Council Acceptance Criteria for Post-installed Adhesive Anchors in Concrete Elements (AC308).
- C. Acceptable products:
- 1. Hilti Inc., HIT-RE 500-SD.
 - 2. Simpson Strong-Tie, SET-XP.
 - 3. No substitution permitted.

2.7 OTHER MATERIALS

- A. Cement mortar: One part Portland Cement, 2½ parts fine aggregate, and sufficient water to obtain a maximum slump of 6 inches.
- B. Bonding grout: One part cement, one part fine aggregate, and sufficient water to obtain the consistency of thick cream.
- C. Patching mortar: One part cement, 2½ parts fine aggregate, and sufficient water to obtain a maximum slump of 1-inch.
- D. Expansion joint filler material: Asphalt type conforming to the latest requirements of ASTM D994.
- E. Clear curing and sealing compound: liquid membrane-forming clear high solids acrylic copolymer compound complying with ASTM C309, Type 1.
 - 1. Acceptable products:
 - a. Euclid Chemical Company, Super Rez-Seal.
 - b. Or equal.
- F. Dissipating curing compound: Liquid membrane-forming hydrocarbon resin dissipating curing compound complying with ASTM C309, Type 1.
 - 1. Acceptable products:
 - a. Euclid Chemical Company, Kurez DR.
 - b. Or equal.
- G. 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.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 FORMS

- A. Design, erect, support, brace, and maintain formwork to safely support vertical and lateral loads until such loads can be supported safely by the concrete structure.
- B. Assemble forms with tight flush joints securely clamped to prevent leakage of mortar. Brace forms to safely support concrete without deformation under load.
- C. Construct forms within the tolerance limits of permissible variations from lines, grades, and dimensions shown on the Drawings, in accordance with ACI 347 "Recommended Practice for Concrete Formwork".

- D. Construct forms to the exact sizes, shapes, lines, and dimensions shown, and as required to obtain accurate alignment, location, grades, and level and plumb work in the finished structure.
- E. Support forms for slabs supported on steel or precast concrete beams from the same beams or framing so that deflection of structural supports will occur with the placing of the concrete.
- F. Notify the Engineer when formwork is complete so that a proper check may be made at least 24 hours prior to concrete placement.
- G. Carefully remove forms, ensuring complete protection of the structure.
- H. Remove forms for vertical sides of walls, beams, girders, columns, and other similar structural members 24 hours minimum after placement of concrete, provided the concrete has hardened sufficiently and will not be damaged.
- I. Do not remove forms and bracing for slabs, beams, girders, and similar structural members until the concrete structural members have attained sufficient strength to safely support their own weight and any construction or storage load.

3.3 REINFORCING

- A. Comply with the following, as well as the specified standards, for details and methods of reinforcing placement and supports.
 - 1. Clean reinforcement and remove loose dust and mill scale, earth, and other materials that reduce bond or destroy bond with concrete.
 - 2. Accurately place and secure reinforcing steel within the tolerances required by ACI 318 using tie bars, chairs, bolsters, wire, clips or other devices approved by the Engineer.
 - 3. Provide plastic protected bar supports for slab reinforcing.
 - 4. Place bar supports for grade beams and slabs on bearing plates or blocks to prevent displacement into the earth subgrade.
 - 5. Place reinforcement to obtain the following clear coverages for concrete protection, within tolerance limits specified in ACI 318 "Building Code Requirements for Structural Concrete":
 - a. Footings and slab surfaces on earth: 3 inches.
 - b. Walls and beams, column and slab surfaces exposed to weather or earth, or submerged: 2 inches.
 - c. Other beams and columns: 1½ inches.
 - d. Other slab surfaces: ¾-inch.

6. Provide the following minimum clear distances between parallel reinforcing bars, between adjacent contact splices, and between a contact splice and an adjacent bar:
 - a. Columns: 1½ inches, 1½ times the bar diameter, or 1½ times the maximum size of the coarse aggregate, whichever is larger.
 - b. Other elements: 1-inch, one bar diameter, or 1-1/3 times the maximum size of coarse aggregate, whichever is larger.
7. Reinforcing bar splices:
 - a. 40 bar diameters in length, unless otherwise shown on the Drawings.
 - b. Staggered in adjacent bars where practical.
 - c. Securely tied.
 - d. Welded only where shown on the Drawings, conforming to the requirements of AWS D12.1.
8. Install welded wire reinforcement in lengths as long as practicable, lapping adjoining pieces two full mesh panels minimum.

3.4 EMBEDDED ITEMS

- A. Provide for the proper placement and support of fittings, inserts, fixtures, and sleeves to be built into the concrete work under other sections of the Specifications.

3.5 MIXING CONCRETE

- A. Project site batched-mixed concrete:
 1. Mix in accordance with ACI 301, Chapter 7.
- B. Ready-mixed concrete:
 1. Pre-mix and transport to project site in accordance with ASTM C94.
 2. Record time of departure from the mixing plant and batch weights of cement and water on the delivery tickets.
 3. Water may be added to the ready-mixed concrete once after delivery, only if the maximum water cement ratio and slump will not be exceeded.
 4. Reject concrete not in place within 60 minutes after introducing water to the mix when transported in agitator trucks or within 30 minutes after introducing water to the mix when transported in nonagitator trucks.

3.6 PLACING CONCRETE

- A. Preparation:
 1. Remove hardened concrete and foreign material from conveying equipment.
 2. Remove foreign matter and excess water accumulated in forms.
 3. Rigidly close temporary openings left in formwork.
 4. Thoroughly sprinkle earth subgrades for structural slabs without vapor barrier protection to eliminate moisture absorption.
 5. Before depositing new concrete on or against concrete which has hardened:
 - a. Thoroughly clean hardened concrete and saturate with water.
 - b. Thoroughly cover hardened concrete surface with a 1/8-inch thick coating of neat cement mortar and place new concrete before the mortar has attained its initial set.
 6. Use only clean tools.

- B. Conveying:
1. Convey concrete from the mixer to place of final deposit as rapidly as practical by methods which will prevent separation or loss of ingredients and assure the required quality of concrete.
 2. Deposit concrete as nearly as practicable to its final location to avoid separation due to rehandling and flowing.
 3. Do not allow free fall of concrete to exceed 5 feet.
 4. Do not use concrete which becomes non-plastic and unworkable, or does not meet required quality control limits, or has been contaminated by foreign materials.
 5. Remove rejected concrete from job site.
- C. Placing concrete in forms:
1. Deposit concrete continuously or in layers so that no concrete will be placed on concrete which has hardened sufficiently to cause cold joints in the work.
 2. If necessary, add construction joints, approved by the Engineer.
 3. Remove temporary spreaders, screeds, etc. as they become unnecessary.
- D. Placing concrete slabs:
1. Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until placing of a panel or section is completed.
 2. Bring slab surfaces to correct level with a straightedge, and then strike off.
 3. Use bullfloats or darbies to smooth the surface, leaving it free of bumps and hollows.
 4. Do not sprinkle water on plastic surface. Do not disturb slab surface prior to start of finishing operations.
 5. Place beams, girders, brackets, column capitals, haunches, and drop panels integrally with slabs.
- E. Do not begin placement of concrete in supported structural members until concrete previously placed in columns and walls is no longer plastic.

3.7 CONSOLIDATION

- A. General:
1. Consolidate each layer of concrete immediately after placing, by use of mechanical vibrators supplemented by hand spading, rodding, or tamping so that the concrete is thoroughly worked around reinforcement, embedded items, and into corners of the forms, eliminating all air or stone pockets which may cause honeycomb, pitting, or planes of weakness.
 2. Use mechanical vibrators with a minimum frequency of 7,000 revolutions per minute.
 3. Insert vibrator at points approximately 18 inches apart for approximately 5 to 15 seconds at each point, sufficient to consolidate concrete, but not to cause segregation.
 4. Do not overvibrate or use vibrators to transport concrete inside forms.
 5. Provide a spare vibrator and auxiliary power source at the site during placement operations.

3.8 JOINTS

A. Construction joints:

1. Do not relocate construction joints shown on the Drawings or add construction joints, unless approved by the Engineer. Where additional construction joints are approved by the Engineer, provide waterstops consistent with design.
2. Form construction joints perpendicular to main reinforcement and near quarter points of slabs, beams, and girders.
3. Limit spacing of vertical construction joints to 40 feet in any one direction.
4. Locate horizontal wall and column construction joints at the top of footings and grade slabs and the underside of slabs, beams, and girders.
5. Continue reinforcing steel across construction joints as shown on the Drawings or as required by the Engineer.
6. Form keyways in construction joints a minimum of 1½ inches deep and 3½ inches wide unless otherwise shown on the Drawings.
7. Provide the following minimum bearing lengths on concrete walls and columns unless otherwise shown on the Drawings:
 - a. Two inches for slabs.
 - b. Six inches for beams and girders.

B. Expansion joints:

1. Form expansion joints ½-inch wide with chamfered edges.
2. Fill expansion joints full depth with expansion joint material.
3. Do not permit reinforcement or other embedded metal items that are being bonded with concrete (except dowels in floors bonded on only one side of the joints) to extend continuously through any expansion joint.

C. Contraction joints:

1. Sawcut joints: Cut 1/8-inch wide joints to a minimum depth of 1/4 the thickness of the slab, but not less than 1-inch. Perform saw cutting within 12 hours of placement when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.
2. Formed joints: Insert preformed plastic or hard board joint strips into the concrete to form 1/8-inch wide joints to a minimum depth of 1-inch.
3. Fully caulk joints with sealant.

3.9 CONCRETE FINISHING

- A. Finish concrete work to smooth, clean surfaces of uniform color with no roughness or imperfections.
- B. Remove roughness, projections, honeycomb, and other defects in formed concrete surfaces to sound concrete.

- C. Patch depressions and tie holes immediately after form removal.
1. Thoroughly wet areas to be patched to prevent absorption of water from patching mortar.
 2. Thoroughly brush bonding grout on areas to be patched.
 3. Consolidate patching mortar into place and strike off to leave a patch slightly higher than surrounding concrete surface to allow for initial shrinkage.
 4. Leave patch area undisturbed for at least one hour before final finishing.
 5. Prepared proprietary compounds for bonding grout and patching mortar may be used in lieu of or in addition to the above patching procedure, if approved by the Engineer.
- D. Unless otherwise shown on the Drawings, provide the following finishes at the indicated locations:
1. Scratch finish:
 - a. Monolithic slab surfaces that are to receive concrete floor topping or mortar setting bed.
 2. Float finish:
 - a. Monolithic slab surfaces that are to receive trowel finish and other slab finishes specified herein.
 - b. Slab surfaces which are to receive a separate concrete topping, terrazzo, quarry tile, waterproofing membranes, and roofing.
 3. Trowel finish:
 - a. Monolithic slab surfaces that are to be exposed to view, unless otherwise shown.
 - b. Slab surfaces that are to be covered with resilient flooring, carpeting, paint, or asphalt.
 - c. Slab surfaces of channels, tanks, reservoirs, basins, and chambers.
 4. Non-slip broom finish:
 - a. Walks, stairs, drives, ramps, and similar pedestrian and vehicular areas.
 - b. Apply by dragging coarse bristle broom or burlap belt across concrete with uniform parallel overlapping strokes.
 5. As-formed finish:
 - a. Surfaces adjacent to earth and more than 12 inches below finished grade level.
 - b. Other surfaces not exposed to view.
 6. Smooth rubbed grout finish:
 - a. Exposed concrete surfaces including walls, beams, columns, and other vertical and inclined surfaces.
 - b. Undersides of walkways and slabs.
 - c. Tops and vertical or inclined surfaces of walls, inside tanks, reservoirs, basins, and chambers.
 - d. Surfaces adjacent to earth, stone, sand, or other special media to a depth of 12 inches below the required material grade line or low water level.
 - e. Apply finish to freshly hardened concrete as soon as possible after removal of forms.
 - f. Apply grout slurry, consisting of one part cement to 1½ parts fine aggregate mixed with water, uniformly over a predampened surface with clean burlap pads or with sponge-rubber or cork floats.

- g. Rub grout surface with carborundum stone or similar abrasive to produce a uniform color and texture.
- h. Remove excess grout with a dry burlap pad or a brush.

3.10 CONCRETE CURING

- A. Protect fresh concrete and grout surfaces from premature drying and excessively hot or cold temperatures.
- B. Cure fresh concrete and grout surfaces in a moist condition at a relatively constant temperature for at least 7 days after placement of Type I Portland Cement concrete, or longer if necessary for hydration and proper hardening of the concrete.
- C. Perform curing by one of the following methods:
 - 1. Ponding or continuous water spraying on concrete surface.
 - 2. Covering concrete surfaces with continuously wetted burlap, cotton, or other absorptive mats or fabric.
 - 3. Covering concrete surfaces with impervious waterproof paper or polyethylene film having 4-inch tape-sealed laps at common edges and taped-sealed and weighted perimeter.
 - 4. Applying curing compound on concrete surfaces to which additional concrete will not be bonded:
 - a. For exposed interior floor surfaces which will not receive floor covering or other coatings: Apply first coat of clear curing and sealing compound at a minimum rate of 400 square feet per gallon, as soon as possible after finishing operations are completed. Apply second coat at a minimum rate of 450 square feet per gallon, at least 3 days after the first application or upon completion of construction whichever is later.
 - b. For all other surfaces: Apply one coat of dissipating curing compound at a minimum rate of 300 square feet per gallon and in strict accordance with the manufacturer's recommendations.
- D. Maintain temperature of fresh concrete between 50 degrees and 70 degrees F for the required curing period.
- E. Provide and erect necessary facilities for heating, covering, insulating, or housing the concrete work for cold weather protection.

3.11 CONCRETE TESTING

- A. Provide equipment and services required for sampling and testing concrete.
- B. Include the cost of testing in the total amount of the contract price for concrete work.
- C. Sample concrete in accordance with ASTM C172.
- D. Slump testing:
 - 1. Perform in accordance with ASTM C143.
 - 2. Perform one test minimum for each 50 cubic yards of concrete placed in one operation to check and maintain the required consistency of concrete.

3. Perform whenever required by the Engineer.
- E. Air content testing:
1. Perform concurrently with the taking of the concrete compression test cylinder specimens.
 2. Perform in accordance with one of the following methods:
 - a. ASTM C231 pressure method.
 - b. ASTM C173 volumetric method.
 - c. ASTM C138 gravimetric method.
- F. Compression testing:
1. Make and cure compression test cylinder specimens in accordance with ASTM C31.
 2. Take one set of cylinders (4 cylinders) for every concrete pour for structural slabs, walls, beams, girders, footings, and columns, and additional sets for each 100 cubic yards of concrete placed in one operation.
 3. Take test cylinder specimens as directed by the Engineer to obtain representative samples of the concrete materials.
 4. Cure the specimens on the job site under the same field conditions as the concrete work they represent for a minimum of 72 hours after sampling.
 5. Test two of each set of concrete test cylinder specimens for compressive strength at 7 days and at 28 days in accordance with ASTM C39 (testing to be performed by an independent testing laboratory approved by the Engineer).
 6. In any case where test results of concrete cylinder specimens fail to meet minimum compressive strength requirements, make additional tests in accordance with ASTM C42 or perform load tests in accordance with ACI 318, as required by the Engineer.
 7. If these alternate strength tests show that concrete work does not meet minimum strength requirements, remove unsatisfactory concrete and reconstruct the work.

3.12 CUTTING AND PATCHING OF EXISTING CONCRETE

- A. Provide neat and smooth finished exposed surfaces.
- B. Provide one inch deep (minimum) saw cuts.
- C. Cut off exposed reinforcing bars a minimum of one inch back of finished surface and fill remaining cavity with patching mortar.
- D. Provide straight and square lines at finished openings and 3/4-inch chamfers at exposed corners.
- E. Core drill openings for new pipes and conduits and patch with non-shrink grout.
- F. Grind exposed finished surfaces flush to meet and match existing surfaces.

3.13 ANCHORING WITH EPOXY ADHESIVE

- A. Drill holes, prepare surface, mix and place epoxy adhesive, and set reinforcing steel bars and threaded rod anchors in accordance with the epoxy adhesive manufacturer's instructions.
1. Identify location of reinforcing steel and other embedded items prior to drilling holes for bars and anchors. Do not cut or damage reinforcing steel, prestressed steel tendons, piping, conduits or other embedded items. Notify the Engineer of reinforcing steel or other embedded items encountered during drilling.
 2. Use drill type, bit type and diameter recommended by the manufacturer.
 3. Drill holes perpendicular to surface of concrete after concrete has achieved full design strength.
 4. Clean holes to remove loose material and drilling dust prior to installation of bars and anchors.
 5. Inject adhesive into holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
 6. Inject sufficient adhesive in the hole to ensure that the annular gap is filled to the surface. Remove excess adhesive from the surface. Shim with device suitable to center the bars and anchors in the holes. Do not disturb or load bars and anchors before the specified cure time has elapsed.
 7. Observe recommendations with respect to installation temperatures.

3.14 REMEDIAL WORK

- A. Repair or replace deficient work as directed by the Engineer and at no additional cost to the Owner.

END OF SECTION

SECTION 09 90 00

PAINTING AND COATING

PART 1 - GENERAL

1.1 SUMMARY

- A. Paint and finish exposed surfaces using the combination of materials listed on Painting Schedule in Part 3 of this Section, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
 - 1. Priming or priming and finishing of certain surfaces may be specified to be factory-performed or installer-performed under pertinent other Sections.
- C. References:
 - 1. Reserved.
- D. Work not included:
 - 1. Metal surfaces of submerged galvanized metal more than 12 inches below water surface, anodized aluminum, stainless steel, chromium plate, and similar finished materials will not require painting under this Section except as may be so specified in other Sections of these Specifications.
 - 2. Do not paint moving parts of operating units; mechanical or electrical parts such as valve operators; linkages; sensing devices; and motor shafts, unless otherwise specified.
 - 3. Do not paint over required labels or equipment identification, performance rating, name, or nomenclature plates.
 - 4. Do not paint explosion-proof light fixtures, junction boxes, fittings or accessories.
- E. Definitions:
 - 1. "Paint" as used herein, means coating systems materials including primers, emulsions, epoxy, enamels, sealers, fillers, and other applied materials whether used as prime, intermediate, or finish coats.

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
 - 1. Materials list of items proposed to be provided under this Section.
 - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
 - 3. Color charts for selection of colors by the Owner.
- B. Operation and Maintenance Manuals – None Required.

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- C. Certificates and Guarantees:
 - 1. Contractor Qualifications - Provide certification of previous experience and equipment necessary to apply/install the specified painting and coating systems.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.
- F. Comply with pertinent provisions of Section 01 33 01.

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Paint coordination:
 - 1. Within 35 calendar days after the Contractor has received the Engineer's Notice to Proceed, arrange a conference with a technical representative of the paint manufacturer, the Engineer, the Contractor, and the Owner to:
 - a. review the paint systems to be used;
 - b. select colors;
 - c. review painting procedures; and
 - d. establish painting schedule.
 - 2. Notify the equipment manufacturers and miscellaneous metals fabricators of the correct shop primer to be used to assure compatibility of the total coating system.
 - 3. Review other Sections of these Specifications as required, verifying the prime coats to be used and assuring compatibility of the total coating system.
 - 4. Provide barrier coats over non-compatible primers, or remove the primer and reprime as required.
 - 5. Notify the Engineer in writing of anticipated problems in using the specified coating systems over prime-coatings supplied under other Sections.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.
 - 1. Store materials in a safe, ventilated location.
 - 2. Remove oily rags, waste, etc. every day and do not allow to accumulate under any circumstances.
 - 3. Take precautions to prevent spontaneous combustion.

1.5 SITE CONDITIONS

- A. Do not apply paints when the temperature of surfaces to be painted and the surrounding air temperatures are below 50 degrees F, unless otherwise permitted by the manufacturers' printed instructions as approved by the Engineer.
- B. Weather conditions:
 - 1. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85 percent; or to damp or wet surfaces, unless otherwise permitted by the manufacturers' printed instructions as approved by the Engineer.
 - 2. Applications may be continued during inclement weather only within the temperature limits specified by the paint manufacturer as being suitable for use during application and drying periods.

1.6 MAINTENANCE

- A. Upon completion of the work of this Section, deliver to the Owner an extra stock equaling 10 percent, but not less than one gallon, of each color, type, and gloss of paint used in the Work, tightly sealing each container, and clearly labeling with contents and location where used.

PART 2 - PRODUCTS

2.1 PAINT MATERIALS

- A. Acceptable materials:
 - 1. The Painting Schedule in Part 3 of this Section is based on products of the Tnemec Company, Inc., except where another manufacturer is named for a specific application.
 - 2. Products of other manufacturers may be submitted for review in accordance with provisions of the Contract.
 - 3. Where products are proposed other than those specified by name and number in the Painting Schedule, provide submittal required by Article 1.2 of this Section and a new painting schedule compiled in the same format used for the Painting Schedule included in this Section.
- B. Undercoats:
 - 1. Provide undercoat paint produced by the same manufacturer as the finish coat.
 - 2. Insofar as practicable, use undercoat and finish coat material as parts of a unified system of paint finish.
- C. Provide all paints and materials supplied by one manufacturer.

2.2 APPLICATION EQUIPMENT

- A. For application of the approved paint, use only such equipment as is recommended for application of the particular paint by the manufacturer of the particular paint, and as approved by the Engineer.
- B. Prior to use of application equipment, verify that the proposed equipment is actually compatible with the material to be applied, and that integrity of the finish will not be jeopardized by use of the proposed equipment.

2.3 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.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed.
 - 1. Correct conditions detrimental to timely and proper completion of the Work.
 - 2. Do not proceed until unsatisfactory conditions are corrected.

3.2 MATERIALS PREPARATION

- A. General:
 - 1. Mix and prepare paint materials in strict accordance with the manufacturers' recommendations as approved by the Engineer.
 - 2. When materials are not in use, store in tightly covered containers.
 - 3. Maintain containers used in storage, mixing, and application of paint in a clean condition, free from foreign materials and residue.
- B. Stirring:
 - 1. Stir materials before application, producing a mixture of uniform density.
 - 2. Do not stir into the material any film which may form on the surface, but remove the film and, if necessary, strain the material before using.

3.3 SURFACE PREPARATION

- A. General:
 - 1. Perform preparation and cleaning procedures in strict accordance with the paint manufacturers' recommendations as approved by the Engineer.
 - 2. Remove removable items such as hardware, accessories, nameplates, fixtures which are in place and are not scheduled to receive paint finish;

- or provide surface applied protection prior to surface preparation and painting operations.
3. Following completion of painting in each space or area, reinstall the removed items by using workmen who are skilled in the necessary trades.
 4. Clean each surface to be painted prior to applying paint or surface treatment.
 5. Schedule the cleaning and painting so that dust and other contaminants from the cleaning process will not fall onto wet newly painted surfaces and other surfaces.
- B. Preparation of wood surfaces:
1. Fill, prime and clean wood surfaces until free from dirt, oil, and other foreign substance.
 2. Smooth finished wood surfaces exposed to view, using the proper sandpaper to produce a uniformly smooth and unmarred wood surface.
- C. Preparation of metal surfaces:
1. Thoroughly clean surfaces until free from dust, dirt, black oxide, scale, rust, paint, oil, and grease in accordance with The Society for Protective Coatings (SSPC) Specifications required in Paint Schedule.
 2. On galvanized surfaces, prepare in accordance with the methods outlined in ASTM D 6386-99 Standard Practice for Preparation of Zinc (Hot Dipped Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting.
- D. Preparation of concrete and masonry surfaces:
1. Clean concrete and masonry surfaces by the methods outlined in SSPC SP-13, Surfaces Preparation of Concrete. Use wire brushing, scraping, high pressure water cleaning, mechanical abrasion, blast tracking, or sandblasting as necessary and as required on the Paint Schedule. Vacuum clean, air blast clean or water clean to remove dirt, dust and loose material. Steam clean or detergent clean to remove oils and grease, efflorescence, stains and contaminants.
 2. Allow new concrete and masonry to cure a minimum of 28 days before paint application.
 3. Level protrusions and mortar spatter.
- E. Preparation of Ductile and Cast Iron Surfaces:
1. Solvent clean in accordance with NAPF 500-03-01 Surface Preparations Standard for Solvent Cleaning.
 2. Abrasive Blast Cleaning of Ductile and Cast Iron:
 - a. For external pipe surfaces, abrasive blast clean in accordance with NAPF 500-03-04 Surface Preparations Standards for Abrasive Blast Cleaning – External Pipe Surfaces.
 - b. For internal pipe surfaces, abrasive blast clean in accordance with NAPF 500-03-04 Surface Preparations Standards for Abrasive Blast Cleaning – Internal Pipe Surfaces.

3.4 PAINT APPLICATION

A. General:

1. Touch-up shop-applied prime coats which have been damaged, and touch-up bare areas prior to start of finish coats application.
2. Notify the Engineer or the Owner of the completion of each coat.
 - a. Do not apply additional coats until the completed coat has been inspected and approved.
 - b. Only the inspected and approved coats of paint will be considered in determining the number of coats applied.
3. Do all necessary touching up after other mechanics have finished and leave entire work in a neat and clean condition.
4. Do not leave paint spots on glass, hardware, floors, or other finished work.
5. If required by the Engineer, tint by mixing a small amount of white paint of the exact same type with any or all paint used prior to the final coat so that the area covered by the application of each coat is readily discernible.
6. Provide an approved gauge for determining the mil thickness of the paint on a surface.

B. Drying:

1. Allow sufficient drying time between coats, modifying the period as recommended by the material manufacturer to suit adverse weather conditions.

C. Brush applications:

1. Apply the painting materials by brush and work the brush coats onto the surface in an even film.
2. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, and other surface imperfections will not be acceptable.

D. Spray application:

1. Except as specifically otherwise approved by the Engineer, confine spray application to metal and similar surfaces where hand brush work would be inferior.
2. Where spray application is used, apply each coat to provide the hiding equivalent of brush coats.
3. Do not double back with spray equipment to build up film thickness of two coats in one pass.
4. Protect other surfaces from over spray.

- E. For completed work, match the approved texture, color, and coverage. Remove, refinish, or repaint work not in compliance with the specified requirements.

3.5 PAINTING SCHEDULE

Dry Film - mils

- A. Steel, iron, galvanized and non-ferrous metal; tanks, pipes, conduits, electrical boxes, and equipment:
1. Exterior, non-immersion: System Series 1075 Endura-Shield.
 - a. Surface preparation: SSPC-SP6 Commercial Blast Cleaning for ferrous metal; ASTM D 6386-99 for galvanized; scarify non-ferrous metal; NAPF 500-03 for cast & ductile iron.
 - b. 1st Coat: Tnemec Series 1 Omnithane. 2.5 - 4.0
 - c. 2nd Coat: Tnemec Series N69-Color Hi-Build Epoxoline II. (2-3 mil dft for galvanized and non-ferrous metal.) 4.0 - 6.0
 - d. 3rd Coat: Tnemec Series 1075-Color Endura-Shield II. 2.0 - 3.0
8.5 - 13.0
 2. Interior, non-immersion: System Series N69 Hi-Build Epoxoline II.
 - a. Surface preparation: SSPC-SP6 Commercial Blast Cleaning for ferrous metal; ASTM D 6386-99 for galvanized; scarify non-ferrous metal; NAPF 500-03 for cast & ductile iron.
 - b. 1st Coat: Tnemec Series 1 Omnithane. 2.5 - 4.0
 - c. 2nd Coat: Tnemec Series N69-Color Hi-Build Epoxoline II. (2-3 mil dft for galvanized and non-ferrous metal.) 4.0 - 6.0
 - d. 3rd Coat: Tnemec Series N69-Color Hi-Build Epoxoline II. (2-3 mil dft for galvanized and non-ferrous metal.) 4.0 - 6.0
10.5 - 16.0
 3. Immersion, or subject to splash or spray of potable water: System Series N140 Pota-Pox Plus.
 - a. Surface Preparation: SSPC-SP10 Near White Metal Blast Cleaning. NAPF 500-03 for cast & ductile iron.
 - b. 1st Coat: Tnemec Series 1 Omnithane. 2.5 - 4.0
 - c. 2nd Coat: Tnemec Series N140-15BL Tank White Pota-Pox Plus. 3.0 - 5.0
 - d. 3rd Coat: Tnemec Series N140-1255 Beige Pota-Pox Plus. 3.0 - 5.0

Dry Film - mils

- | | | |
|----|---|--|
| e. | 4 th Coat: Tnemec Series N140-15BL Tank White Pota-Pox Plus. | <u>3.0 - 5.0</u>
11.5 - 19.0 |
| 4. | Immersion, or subject to splash or spray of non-potable water: System Series N69 Hi-Build Epoxoline II. | |
| a. | Surface Preparation: SSPC-SP10 Near White Metal Blast Cleaning. NAPF 500-03 for cast & ductile iron. | |
| b. | 1 st Coat: Tnemec Series 1 Omnithane. | 2.5 - 4.0 |
| c. | 2 nd Coat: Tnemec Series N69-Color Hi-Build Epoxoline II. | 3.0 - 5.0 |
| d. | 3 rd Coat: Tnemec Series N69-Color Hi-Build Epoxoline II. | 3.0 - 5.0 |
| e. | 4 th Coat: Tnemec Series N69-Color Hi-Build Epoxoline II. | <u>3.0 - 5.0</u>
11.5 - 19.0 |
| 5. | High temperature surfaces: System Series 39 Silicone Aluminum. | |
| a. | Surface Preparation: SSPC-SP10 Near White Metal Blast Cleaning. | |
| b. | 1 st Coat: Tnemec Series 39-1261 Silicone Aluminum. | 1.0 - 1.5 |
| c. | 2 nd Coat: Tnemec Series 39-1261 Silicone Aluminum. | <u>1.0 - 1.5</u>
2.0 - 3.0 |
| B. | Concrete: | |
| 1. | Interior, exposed including floor: System Series N69 Hi-Build Epoxoline II. | |
| a. | Surface Preparation: SSPC SP-13, fill voids with Tnemec Series 218 MortarClad. | |
| b. | 1 st Coat: Tnemec Series N69-W6160 Hi-Build Epoxoline II. | (80-100 sq. ft./gal.) |
| c. | 2 nd Coat: Tnemec Series N69-Color Hi-Build Epoxoline II. | 3.0 - 4.0 |
| d. | 3 rd Coat: Tnemec Series N69-Color Hi-Build Epoxoline II. | <u>3.0 - 4.0</u>
(Topcoats) 6.0 - 8.0 |
| C. | Concrete Block and Split Face Concrete Block: | |
| 1. | Interior: System Series N69 Hi-Build Epoxoline II. | |
| a. | Surface Preparation: Allow new mortar to cure 28 days, level protrusions and mortar spatter. | |
| b. | 1 st Coat: Tnemec Series N69-W6160 Hi-Build Epoxoline II. | (75-100 sq. ft./gal.) |

Dry Film - mils

- | | | |
|----|--|---|
| c. | 2 nd Coat: Tnemec Series N69-Color Hi-Build Epoxoline II. | 3.0 - 4.0 |
| d. | 3 rd Coat: Tnemec Series N69-Color Hi-Build Epoxoline II. | <u>3.0 - 4.0</u> |
| | | (Topcoats) 6.0 - 8.0 |
| 2. | Exterior: Water repellant and penetrating color stain. System Series 607 Conformal Stain. | |
| a. | Surface Preparation: Allow new mortar to cure 28 days, level protrusions and mortar spatter. | |
| b. | 1 st Coat: Tnemec/Chemprobe Series 633 Prime A Pell H2O. | 50-75 sq. ft./gal. |
| c. | 2 nd Coat: Tnemec/Chemprobe Series 617 Conformal Stain WB. | 75-100 sq. ft./gal. |
| d. | 3 rd Coat: Tnemec/Chemprobe Series 617 Conformal Stain WB. | 75-100 sq. ft./gal. |
| D. | Wood: | |
| 1. | Interior and exterior: System Series 113 HB Tneme-Tufcoat. | |
| a. | Surface Preparation: Clean and dry. | |
| b. | 1 st Coat: Tnemec Series 151-1051 Elasto-Grip FC. | 1.0 - 1.5 |
| c. | 2 nd Coat: Tnemec Series 113 H.B. Tneme-Tufcoat. | 2.0 - 3.0 |
| d. | 3 rd Coat: Tnemec Series 113 H.B Tneme-Tufcoat. | <u>2.0 - 3.0</u>
5.0 - 7.5 |
| E. | Face brick: Concrete Block and Split Face Concrete Block: | |
| 1. | Exterior: Water repellant system & Graffiti Shield system. Series V626 Dura-A-Pell GS. | |
| a. | Surface preparation: Clean and dry. | |
| b. | 1 st Coat: Tnemec Series V626 Dura-A-Pell GS. | (Brick: 125-150 sq. ft./gal.)
(CMU: 65 -85 sq. ft./gal.) |
| c. | 2 nd Coat: Tnemec Series 626 Dura-A-Pell GS. | (Brick: 125-150 sq. ft./gal.)
(CMU: 65 -85 sq. ft./gal.) |
| F. | Insulated pipe: | |
| 1. | Interior and exterior: System Series 1029 Enduratone. | |
| a. | Surface Preparation: Clean and dry. | |
| b. | 1 st Coat: Tnemec Series 1029 Enduratone. | 2.0 - 3.0 |
| c. | 2 nd Coat: Tnemec Series 1029 Enduratone. | <u>2.0 - 3.0</u>
4.0 - 6.0 |

Dry Film - mils

G. PVC:

- 1. Interior: System Series N69 Hi-Build Epoxoline II.
 - a. Surface Preparation: Hand Sand to Scarify.
 - b. 1st Coat: Tnemec Series N69-Color Hi-Build Epoxoline II. 2.0 - 3.0
 - c. 2nd Coat: Tnemec Series N69-Color Hi-Build Epoxoline II. 2.0 - 3.0
4.0 - 6.0

- 2. Exterior: System Series 1075 Endura-Shield II.
 - a. Surface Preparation: Hand Sand to Scarify.
 - b. 1st Coat: Tnemec Series N69-Color Hi-Build Epoxoline II. 2.0 - 3.0
 - c. 2nd Coat: Tnemec Series 1075 Endura-Shield II. 2.0 - 3.0
4.0 - 6.0

3.6 EXISTING SURFACES

A. General:

- 1. Paint existing structures, equipment, piping, conduit, and appurtenances that remain in use as part of the Project to blend with new structures only.
- 2. Comply with coating manufacturer's recommendations for surface preparation and painting of existing surfaces.
- 3. Refer to 3.7 Schedule for coating systems.

3.7 PIPELINE IDENTIFICATION COLORS AND LABELS

A. Paint pipelines including fittings and valves to match existing piping and equipment or with the following color scheme:

- | | | | |
|----|--------------------------|------|---|
| 1. | Potable water lines: | 11SF | Safety Blue |
| 2. | Non-potable water lines: | 11SF | Safety Blue with 3-inch
02SF Bright Yellow band
spaced 30 inches apart. |
| 3. | Sewage lines: | GR28 | Fossil |
| 4. | Gas lines: | 28RD | Monterrey Tile |
| 5. | Compressed air lines: | 91GN | Balsam |
| 6. | Chlorine lines: | 02SF | Safety Yellow |
| 7. | Fluoride lines: | 25BL | Fountainblue* |

*Include 6-inch wide 06SF Safety Red bands spaced 30 inches apart.

END OF SECTION

SECTION 22 05 53

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide piping and equipment identification materials, where shown on Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
 - 1. Plumbing: Division 22.
 - 2. Electrical: Division 26.
- C. Section Includes:
 - 1. Plastic pipe markers.
 - 2. Valve tags.
 - 3. Plastic equipment markers.
 - 4. Piping system color coding schedule.
- D. Identification furnished as part of equipment is specified as part of equipment assembly in other sections and shall comply with requirements of this Section.
- E. Refer to Division 26 sections for identification requirements of electrical and instrumentation work.

1.2 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. A13.1-1996 – Scheme for Identification of Piping Systems.
- B. Federal Specifications (FS).

1.3 SUBMITTALS

- A. Product data: Submit manufacturer's technical product data and installation instructions for each identification material and device required. Submit listing of each flow stream identifier with associated color coding.
- B. Samples: Submit samples of each color, lettering style, and other graphic representation required for each identification material or system.
- C. Submit in accordance with Section 01 33 01.

1.4 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of identification devices of types and sizes required.
- B. Regulatory Requirements:
 - 1. ANSI Standards: Comply with ANSI A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Allen Systems, Inc.
- B. Brady (W.H.) Company, Signmark Division.
- C. Marking Services, Inc.
- D. Industrial Safety Supply Company, Inc.
- E. Seton Name Plate Corporation.
- F. Or equal.

2.2 MECHANICAL IDENTIFICATION MATERIALS

- A. Provide manufacturer's recommended products as specified for each application.
- B. Where more than one type of identification is specified for an application, selection is Contractor's option, but provide a single selection for each product category.
- C. All bands, markers, and identification materials used in mechanical rooms and process locations shall be rated for exterior application and suitable for withstanding occasional washdown.

2.3 LETTERING AND GRAPHICS

- A. General: Coordinate names, abbreviations, and other designations used in mechanical identification work with corresponding designations shown, specified or scheduled. Provide numbers, lettering, and wording as indicated or if not otherwise indicated, as recommended by manufacturers or required for proper identification, operation, and maintenance of mechanical systems and equipment.

- B. Multiple Systems: Where multiple systems of same generic name are shown and specified, provide identification indicating individual system number as well as service (i.e., Flow Meter FE/FIT 0101, etc.).

2.4 PLASTIC PIPE MARKERS

- A. Snap-On Type: Provide preprinted, semi-rigid snap-on, color coded pipe markers complying with ANSI A13.1.
- B. Pressure Sensitive Type: Provide preprinted, permanent adhesive, color coded, pressure sensitive vinyl pipe markers complying with ANSI A13.1. Dot matrix printing is not acceptable.
- C. Small Pipes: For external diameters less than 6 inches (including insulation if any), provide full band pipe markers, extending 360 degrees around pipe at each location, fastened by one of the following methods:
1. Snap-on application of pretensioned, semi-rigid plastic pipe marker.
 2. Adhesive lap joint in pipe marker overlap.
 3. Taped to pipe (or insulation) with color coded plastic adhesive tape not less than 4 inches wide, full circle at both ends of pipe marker, tape lapped 1-1/2-inch.
- D. Large Pipes: For external diameter 6 inches and larger (including insulation if any), provide either full band or strip type pipe markers not narrower than 3 times letter height (and of required length), fastened by one of following methods:
1. Taped to pipe (or insulation) with color coded plastic adhesive tape, not less than 4 inches wide, full circle at both ends of pipe marker, tape lapped 3 inches.
 2. Strapped to pipe (or insulation) application of semi-rigid type with manufacturer's standard stainless steel or plastic bands.
- E. Lettering: Comply with piping system nomenclature as specified, scheduled or shown and abbreviate only as necessary for each application length, and only with approval of ENGINEER. Lettering height shall be as follows:

Outside Pipe Diameter (in.)	Minimum Letter Height (in.)	Minimum Length of Marker (in.)
3/4 to 1-1/4	1/2	8
1-1/2 to 2	3/4	8
2-1/2 to 6	1-1/4	12
8 to 10	2-1/2	24
over 10	3-1/2	32

- F. Arrows: Print each pipe marker with arrows indicating direction of flow, either integrally with piping system service lettering (to accommodate both directions), or as separate unit of plastic.

- G. Colors in accordance with ANSI A13.1, color coding schedule, and following:
1. Lettering and arrows:
 - a. Black on yellow background for inherently hazardous materials.
 - b. White on blue (gaseous) or green (liquid) for low hazard materials.
 - c. White on red background for fire quenching materials.
 2. Banding: Colors and band spacing as scheduled or as shown on Drawings.

2.5 VALVE TAGS

- A. HVAC and Plumbing Valve Tags: Provide 19 gauge polished brass valve tags with stamp engraved piping system abbreviation in 1/4-inch high letters, sequenced valve numbers 1/2-inch high, and 5/32-inch hole for fastener.
1. Provide 1-1/2-inch diameter tags except as otherwise indicated.
 2. Fill tag engraving with black enamel.
- B. Process Valve Tags: Provide fiberglass valve tags with printed embedded lettering; piping system abbreviation in approximately 3/16-inch high letters; valve P & ID numbers approximately 3/8-inch high; valve name approximately 3/8-inch high, and 5/32-inch hole for fastener.
1. Provide 2-1/2-inch by 4-inch square white tags with black lettering.
- C. Valve Tag Fasteners: Provide solid brass chain (wire link or beaded type) or solid brass S-hooks of sizes required for proper attachment of tags to valves, manufactured specifically for purpose.

2.6 EQUIPMENT MARKERS

- A. General: Provide 2-ply, 1/8-inch thick laminated plastic, engraved equipment markers.
1. Color: Black letters on white background.
- B. Nomenclature: Include following, matching terminology on schedules as closely as possible:
1. Equipment name and unit number (i.e., Non-potable Water Pump No. 1).
 2. Equipment P & ID Tag No. (i.e., P0601).
- C. Size: Provide approximate 3-inch by 6-inch (minimum) for equipment.
1. 1-inch high letters for equipment tag number.
 2. 1/2-inch high letters for descriptive equipment name.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

- A. Coordinate: Where identification is to be applied to surfaces requiring insulation, painting or other covering or finish including valve tags in finished mechanical

spaces, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.

3.2 PIPING SYSTEM IDENTIFICATION

- A. Locate pipe markers with arrows and color bands as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums), and exterior non-concealed locations.
 - 1. Near each valve and control device.
 - 2. Near locations where pipes pass through walls or floors, ceilings or enter non-accessible enclosures.
 - 3. At access doors, manholes, and similar access points permitting view of concealed piping.
 - 4. Near major equipment items and other points of origination and termination.
 - 5. Spaced intermediately at maximum spacing of 30 ft. along each piping run, except reduce spacing to 20 ft. in congested areas of piping and equipment.
 - 6. On piping above removable acoustical ceilings, except omit intermediately spaced markers.
- B. Locate color bands at each marker and at intermediate spacing not to exceed 10 ft. between bands, and at lesser spacing as indicated or as required by local codes.
- C. Locate directional arrows at each marker. Provide 2 arrows at each tee or branch fitting.
- D. Where piping is normally visible from more than 1 side, provide 2 or 3 labels and arrows spaced at 120 degree intervals around pipe in accordance with ANSI A13.1.
- E. Paint piping and equipment per Section 09 90 00.
- F. Colors listed are general.
- G. For piping scheduled to be color-coded, but not scheduled for complete painting (such as some plastic piping or aluminum jacked insulation) provide additional banding to represent background color. At each banding location provide following sequence:
 - 1. 8 inches wide tape of scheduled pipe color.
 - 2. 4 inches wide tape of scheduled pipe color.
 - 3. 8 inches wide tape of scheduled pipe color.
- H. Provide piping system colors, banding and markers as listed in Table 01080-1 at end of this Section.

3.3 PLUMBING IDENTIFICATION

- A. General: Provide valve tag on every plumbing valve, cock, and flow control device in each piping system. Exclude check valves, valves within factory fabricated equipment units, plumbing fixture faucets, convenience and lawn watering hose valves, shut-off valves at plumbing fixtures, and similar rough-in connections of end use fixtures and units. List each tagged valve in valve schedule for each piping system.
- B. Mount valve schedule frames and schedules, where indicated or, if not otherwise indicated, where indicated by Engineer.
- C. For each page of valve schedule, provide glazed display frame with screws for removable mounting on masonry walls. Provide frames of finished hardwood or extruded aluminum with SSB grade sheet glass.

3.4 PROCESS VALVE IDENTIFICATION

- A. General: Install engraved plastic marker or fiberglass tag at each process valve, gate, or flow control device as identified by P&ID tag numbers on Drawings.

3.5 MECHANICAL EQUIPMENT IDENTIFICATION

- A. General: Install engraved plastic laminate sign or plastic equipment marker on or near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device. Provide signs for each unit having equipment P&ID tag number on Drawings or in specifications.
- B. Electrical and Field Instrumentation Equipment: Provide identification tags, signs, or markers in accordance with Division 26.

3.6 ADJUSTING AND CLEANING

- A. Adjusting: Relocate any mechanical identification device visually blocked by work of this or other divisions.
- B. Cleaning: Clean face of identification devices and glass frames of valve charts.

3.7 FIELD QUALITY ASSURANCE

- A. Final Survey and Repairs:
 - 1. After 1 year of piping, ductwork, and equipment operation, Contractor shall perform walk-through survey of all mechanical identification systems and shall remove and replace any bands, labels, or markers that are loose, discolored, or defective.
 - 2. Replacement materials shall be provided by Contractor.

PIPING IDENTIFICATION SCHEDULE TABLE 22 05 53-1				
Flowstream Identifier	Background Label Color	Pipe Label Text	Pipe Color	Pipe Banding
WATER				
(PW)	Green	Potable Water	See Note 1	Green
NON-POTABLE WATER				
(CS) (ECW) (NPW)	Yellow Yellow Yellow Red	Chlorine Solution Engine Cooling Water Non-Potable Water Fire Protection Water	See Note 1	Yellow Orange Yellow --
AIR				
(CA) (V)	Yellow Yellow	Air – High Pressure Plumbing Vent	See Note 1	Red
FLAMMABLE GAS				
(G)	Yellow	Natural Gas	See Note 1	--
CHEMICAL				
(CL)	Yellow	Chlorine Gas	See Note 1	--
OIL				
(FOS)	Yellow	Fuel Oil	See Note 1	Orange

NOTES

1. Provide pipe colors as specified in Section 09 90 00.

END OF SECTION

SECTION 22 19 13
PIPE AND PIPE FITTINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide pipe and pipe fittings as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Provide labor, materials, tools, chemicals and equipment necessary to perform the pressure and leakage tests and disinfection.
- C. References:
 - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Perform shop and field welding required in connection with the work of this Section in strict accordance with pertinent recommendations of the American Welding Society.
 - 1. Provide the services of an independent testing laboratory to take and test weld specimens or otherwise test welds to verify proper welding procedures as required by the Engineer.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 DUCTILE IRON PIPE (DIP) AND FITTINGS

- A. Flanged joint pipe and fittings:
1. Pipe: Comply with ANSI A21.51, thickness Class 53 with pipe flanges faced and drilled to ANSI Class 125 standard template unless otherwise designated on the Drawings.
 2. Fittings: Comply with ANSI A21.10 or ANSI B16.1.
 3. Flange gaskets: 1/16-inch thick sheet rubber, full face type or 1/8-inch thick Full Faced American Toruseal flange gasket.
 4. Flange bolts, studs, and nuts: Zinc plated type complying with ANSI B16.1.
- B. Mechanical joint pipe, push-on joint pipe:
1. Pipe: Comply with ANSI A21.51, thickness Class 52 unless otherwise designated on the Drawings.
 2. Pipe joints: Comply with ANSI A21.11 for rubber gasket type.
 3. Provide restrained joint pipe system, where indicated on the Drawings utilizing:
 - a. Mechanical joint retainer gland systems that provide locking segments shaped to pipe barrel that do not create stress points on pipe barrel.
 - (1) Do not use setpoint type retainer glands.
 - b. Acceptable products:
 - (1) Meg-A-Lug System.
 - i. Series 1100 Megalug for MJ to pipe.
 - ii. Series 1700 Megalug Harness for push on joint.
 - iii. As recommended by manufacturer for connection to existing pipes.
- C. Fittings:
1. Use ductile iron fittings with mechanical joint complying with ANSI A21.10 or A21.53.
 2. Use cement lining complying with ANSI A-21.4, standard thickness.
 3. Bolts and nuts:
 - a. Use Corten bolts and nuts, or
 - b. Use 316 stainless steel bolts, nuts and washers.
 4. Provide restrained joint type fittings that are compatible with system utilized, as specified by the pipe manufacturer.
- D. Polyethylene sheet: Comply with ANSI/AWWA A 21.5-99/C105:
1. Thickness: linear low-density polyethylene film (minimum 8 mils) or high-density cross laminated polyethylene film (minimum 4 mils).
 2. Markings: The following information will be clearly marked on the sheet at minimum increments of 2-feet along its length:
 - a. Manufacturers name or trademark.
 - b. Year of manufacture.
 - c. Min. film thickness and material type (LLDPE or HDCLPE).

- d. Applicable range of nominal pipe diameter size(s).
 - e. Warning – Corrosion Protection – Repair any damage.
- E. Conductivity appurtenances:
- 1. Provide #10-copper cable and tapping devices specifically designed for this purpose.
 - 2. Use devices provided by the pipe manufacturer.
 - 3. Standard mechanical joints, field lok, or meg-a-lug do not provide conductivity.

2.2 POLYVINYL CHLORIDE PIPE

- A. General:
- 1. Make polyvinyl chloride (PVC) pipe and fittings of Class 12454B material conforming to ASTM D1784.
- B. PVC pressure pipe and fittings:
- 1. Use Schedule 80 with a minimum pressure rating of 125 psi at 73 degrees F, conforming to ASTM D1785.
 - 2. Joints: Use solvent-weld socket type, threaded type, or flanged type.
- C. PVC plastic sewer pipe:
- 1. For pipe and fittings 4-inch through 15-inch:
 - a. Comply with ASTM D3034 for Type PSM polyvinyl chloride (PVC) sewer pipe and fittings of minimum wall thickness SDR 26.
 - b. Joints: Use either the solvent-weld type complying with ASTM D2564 and ASTM D2855, or the elastomeric gasket type complying with ASTM F477 AND ASTM D3212.
 - c. Fittings in sizes through 8-inch: Molded in one piece with elastomeric joints and minimum socket depths as specified in Section 6.2 and 7.3.2 of ASTM D3034.
 - d. Fittings 10-inch and larger: Molded or fabricated in accordance with Section 7.11 of ASTM D3034 with manufacturer's standard pipe bells and gaskets.
 - e. Gaskets for fittings and joints: Provide minimum cross-sectional area of 0.20 square inches complying with ASTM F477.
 - 2. For pipe and fittings 18-inch through 36-inch:
 - a. Comply with ASTM F679 for polyvinyl chloride (PVC) large diameter heavy wall gravity sewer pipe and fittings.
 - (1) Corresponding to SDR 26 (pipe stiffness = 115 psi).
 - b. Joints: Use integral bell gasketed type with elastomeric gaskets to form a watertight seal complying with ASTM F477 or ASTM D3212.
 - 3. Branch fittings: Use either factory fabricated type with attached main line coupling, or solvent welded saddle type attached to the pipe with cement and held in place with stainless steel bands.
 - a. Branch fittings: SDR 26.
 - (1) Acceptable manufacturers:
 - i. GPK Products.
 - ii. Harco.
 - iii. Multi Fittings.
 - iv. Plastic Trends.

- v. Sealtite Sewer Saddles by Geneco.
- vi. Or equal.

- 4. Risers and service pipe and fittings: Use SDR 26, solid wall type complying with ASTM D3034 for PVC pipe.

2.3 PLASTIC DRAINAGE PIPE AND FITTINGS

- A. Use either Schedule 40 PVC-DWV or ABS-DWV conforming to ASTM D2661 or D2665 and bearing the National Sanitation Foundation seal of approval.
- B. Fittings: Use molded, fully recessed, socket type with solvent welded joints or O-ring type joints.
 - 1. Special purpose threaded or flanged adapter fittings, couplings, and unions may be used, provided that they are fully recessed and create no restriction to flow greater than conventional fittings.

2.4 TUBING

- A. Flexible plastic tubing:
 - 1. Use polyethylene tubing with natural color.
 - 2. Wall thickness: 0.040-inch for 1/4-inch tubing and 0.062-inch for 3/8-inch tubing.
 - 3. Fittings: Use instrumental type for unions, connectors, and caps.
- B. Copper tubing and fittings:
 - 1. Comply with ASTM B88 OR ANSI H23.1.
 - 2. Use Type K soft temper seamless tubing for underground piping.
 - 3. Use Type L rigid hard temper seamless tubing for interior piping.
 - 4. Fittings: Use wrought copper solder type conforming to ANSI B16.22.
 - a. Do not use lead solder for potable water piping.
- C. Stainless steel tubing and fittings:
 - 1. Use Seamless Type 304 tubing conforming to ASTM A269 with wall thickness 0.035-inch.
 - 2. Use high pressure stainless steel compression sleeve type fittings.

2.5 WALL PIPES, SLEEVES, AND SEALS

- A. Wall pipes:
 - 1. Use cast iron mechanical joint type with rubber gaskets and flanges tapped for studs, or ANSI Class 125 flange type with flanges tapped for studs.
- B. Wall sleeves:
 - 1. Cast iron wall sleeves: Use mechanical joint type with flanges tapped for studs.
 - 2. Steel wall sleeves: Fabricate sleeve from Schedule 40 black steel pipe.
- C. Link seals:
 - 1. Use modular mechanical type consisting of interlocking solid rubber links designed for positive hydrostatic pressure of 20 psig.
 - a. Connect each pair of links by a carbon steel zinc phosphate plated bolt and nut each with a heavy Delrin plastic elongated washer.
 - 2. Acceptable product: "LINK-SEAL" as manufactured by Thunderline Corp. and supplied by Maddock Mechanical Industries, Inc., Chicago, IL, or equal.
- D. Provide integral intermediate water stop wall collars for all wall pipes and sleeves.

2.6 FLEXIBLE COUPLINGS

- A. Flexible couplings:
 - 1. Use slip ring sleeve type with rubber gaskets, tightening flanges and high strength bolts and nuts, Dresser Style 38, or equal.
 - 2. Provide two tie-rods for each coupling to secure the coupling to the adjacent pipe fitting.
- B. Rubber Expansion Joints:
 - 1. Provide full face flanged rubber expansion joints on both the suction and discharge sides of each booster pump, made of food grade EPDM or food grade neoprene, suitable for potable drinking water with up to 2 mg/l of chlorine, equal to Mercer Rubber Series 450.
 - 2. Provide recommended tie-rod size and number for each coupling to secure the coupling to the adjacent flange fittings.

PART 3 - EXECUTION

3.1 FIELD MEASUREMENTS

- A. Make necessary measurements in the field to assure precise fit of items in accordance with the Drawings.

3.2 INSTALLATION OF PIPING

- A. General:
1. Trench, backfill, and compact for the work of this Section in strict accordance with pertinent provisions of Section 31 23 79 of these Specifications.
 2. Install pipe in accordance with pipe manufacturer's recommendations.
 3. Lay pipe by proceeding upgrade with the spigot ends of bell-and-spigot pipe pointing in direction of flow.
 4. Use proper and suitable tools and appliances for safe and convenient handling and installation of piping.
 5. Continually clear interior of the pipe free from foreign material.
 6. Before making pipe joints, clean and dry all surfaces of the pipe to be joined.
 7. Use lubricants, primers, and adhesives recommended for the purpose by the pipe manufacturer.
 8. Comply with ASTM D2321 for flexible thermoplastic sewer pipe installation.
 9. Make adequate provision for expansion and contraction of piping.
- B. Water main separation:
1. Whenever water mains are encountered in the course of piping installation, notify the Engineer to determine the construction necessary to comply with the provisions of the "Standard Specifications for Sewer and Water Construction in Wisconsin".
- C. Install unions or flanges at piping connections to each piece of equipment, at intervals of not more than 50 feet in straight runs of threaded pipe, at each valve, and wherever else required to disassemble piping for service of fittings, fixtures, equipment and appurtenances.
1. Use unions in piping sizes 3 inches and smaller.
 2. Use flanges in piping sizes larger than 3 inches.
 3. Make connections between ferrous and non-ferrous metal piping with dielectric type insulated unions or flanges.

3.3 EXISTING PIPING

- A. The Drawings show the approximate location of existing piping as indicated by available existing records. The proposed work may require crossing, relocating, and in some cases connecting to the existing piping.
- B. Expose carefully the existing piping throughout the area of proposed work.
1. All existing piping to remain undisturbed and in uninterrupted use until such time as a change is approved by Engineer.
 2. Protect exposed piping from freezing during cold weather.
- C. Where new piping is to cross or be connected to existing piping, make a field check to determine whether any conflict will be encountered in laying the new pipe.
1. Adjust the location of new piping, if necessary, as authorized by the Engineer, to avoid conflict with existing piping.
- D. Where new piping is to connect to existing piping, provide all fittings required to complete the connection, and do the work as expeditiously and carefully as possible.

- E. Remove and replace existing pipe, fittings, valves and all appurtenances as required by the Drawings.
1. Adjust valve boxes as required to meet new finished grade elevations.
 2. Provide new valve stems as required to place the operating nut 2 inches from the top of the valve box.
- F. In the event it becomes necessary, in the opinion of the Engineer, to alter the location of an existing pipe to accommodate construction of the new work, relocate or adjust the existing pipe as directed by the Engineer.
1. Additional compensation for this work will be paid for in accordance with an approved Change Order.

3.4 PIPING SUPPORTS

A. General:

1. Design and provide complete system of supports and anchors for all piping, fittings, valves, fixtures and appurtenances.
2. Absence of pipe supports and details on the Drawings shall not relieve the Contractor of responsibility for providing them.
3. Design pipe support system to withstand dead loads imposed by weight of pipes filled with water plus test pressure and insulation (if required), with a minimum safety factor of 5.
4. Paint pipe supports in accordance with Section 09 90 00.

B. Types of support:

1. Piping adjacent to walls may be supported or braced by wall brackets.
2. Floor pipe supports: Use adjustable with floor flanges, pipe stanchion, and saddle where they do not obstruct passage.
3. Ceiling supported pipe hangers: Use adjustable steel clevis type with full diameter hanger rods conforming to the following sizes:

<u>Pipe Size</u>	<u>Minimum Rod Size</u>
1/2" - 2"	3/8"
2-1/2" - 3-1/2"	1/2"
4" - 5"	5/8"
6" - 12"	7/8"
14" - 16"	1"
18" - 20"	1-1/4"
24" - 30"	1-1/2"

C. Support spacing:

1. For rigid pipes except PVC pipes:

<u>Pipe Size</u>	<u>Maximum Spacing</u>
1/2" - 2"	6'
2-1/2" - 3-1/2"	8'
4" - 5"	8'
6" - 12"	9'
14" - 16"	9'
18" - 20"	9'
24" - 30"	9'

2. For PVC Schedule 80 pipes:

PIPE AND PIPE FITTINGS

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<u>Pipe Size</u>	<u>Maximum Spacing</u>
3/4" and smaller	continuous rigid support
1" - 1-1/2"	4'
2" - 2-1/2"	5'
3"	6'
4" and larger	7'

3. For flexible hose and tubing:
 - a. Provide continuous support by means of rigid carrier pipes or troughs consisting of structural channels or angles which are supported at intervals of 10 feet or less.
 4. Provide a minimum of two pipe supports for each pipe run.
- D. Thrust anchors and guides:
1. Provide thrust anchors and guides to resist thrust due to changes in pipe sizes or direction, or dead end of pipes.

3.5 PIPE RESTRAINING SYSTEMS FOR UNDERGROUND PRESSURE PIPING

- A. General:
1. Provide protection from movement of pressure piping, plugs, caps, tees, valves, hydrants, and bends of 11-1/4 degrees or greater.
 2. Provide concrete thrust blocks, where called out, and at all locations noted in A.1 unless restrained joint type fittings are utilized.
 3. Where restrained joint type fittings are called for on the Drawings, but cannot be utilized, provide concrete thrust blocks.
- B. Concrete thrust blocks:
1. Provide precast or cast-in-place concrete thrust blocking with a compressive strength of 3000 psi in 28 days.
 2. Locate thrust blocking between solid ground and the fitting to be anchored.
 3. Unless otherwise shown or directed by the Engineer, place the base and thrust bearing sides of thrust blocking directly against undisturbed earth.
 4. Sides of thrust blocking not subject to thrust may be placed against forms.
 5. Place thrust blocking so the fitting joints will be accessible for repair.
 6. When conditions prevent the use of concrete thrust blocks, use tie rods or restrained joints of an approved type.
- C. Restrained type pipe and fittings:
1. Provide restraining system as outlined in Part 2 of this Section or utilize metal tie rods, clamps, and lugs to prevent pipe and appurtenances from movement.
 - a. Protect tie rods and clamps with epoxy or bituminous paint.
 2. Where utilizing restrained joint pipe system to immobilize joints or fittings, provide restrained joint pipe to distance indicated on the Drawings, or not less than a minimum of three pipe lengths on each side of the bend or fitting to be restrained.
 - a. Utilization of restrained joint pipe as a substitute to concrete thrust blocking is done at the Contractor's option at no additional cost to the Owner.

3.6 POLYETHYLENE WRAPPING OF DUCTILE IRON PIPE AND APPURTENANCES

- A. Comply with requirements of ANSI/AWWA C105/A21.5-99.
 - 1. Place polyethylene sheet around the entire circumference of the pipe, tie or tape sheet securely to prevent displacement during backfilling.
 - 2. Wrap all water mains, fittings, valves, fire hydrant leaders, fire hydrants, service lines, or other pipe where indicated on the Drawings.
 - a. Wrap copper service lines to a point 3 feet from center of water main.
 - b. Do not block fire hydrant weep hole.

3.7 CONDUCTIVITY APPURTENANCES

- A. Install conductivity through joints by use of copper cable and taps.
 - 1. Use number of copper cable connectors per joint as recommended by the pipe manufacturer.

3.8 TESTING AND INSPECTING

- A. Hydrostatic tests:
 - 1. Where any section of a pressure piping is provided with concrete thrust blocking, do not make hydrostatic tests until at least 5 days after installation of the concrete thrust blocking, unless otherwise directed by the Engineer.
 - 2. Devise a method for disposal of waste water from hydrostatic tests, and for disinfection, as approved in advance by the Engineer.
- B. Testing of pressure piping:
 - 1. Subject the pressure piping to the following hydrostatic pressure:
 - a. Water, sewage, and sludge piping with a normal operating pressure of 20 psig or greater: 125 psig.
 - b. Water, sewage, and sludge piping with a normal operating pressure of less than 20 psig: 50 psig.
 - c. Water, sewage, and sludge pump suction piping: Negative pressure of 7 psig.
 - d. Air and gas piping: Pneumatic pressure of 15 psig.
 - 2. Hold the test pressure for a duration of 30 minutes without pressure loss or further pressure application.
 - 3. Replace or remake joints showing visible leakage.
 - 4. Remove cracked pipe, defective pipe, and cracked or defective joints, fittings, and valves. Replace with sound material and repeat the test until results are satisfactory.
 - 5. Make repair and replacement without additional cost to the Owner.
 - 6. Do not test against existing valves.
- C. Testing of non-pressure piping:
 - 1. Test all non-pressure piping for watertightness by the low pressure air testing, or exfiltration, or infiltration method as selected by the Engineer.
 - 2. Low pressure air test:
 - a. Prior to testing for leakage, flush and clean the lines by passing a snug-fitting inflated rubber ball through the line by upstream water pressure.

- b. Seal pipe openings with airtight plugs and braces.
 - c. Whenever the line to be tested is submerged under groundwater, insert a pipe probe by boring or jetting into the backfill material adjacent to the center of the line to determine the groundwater hydrostatic pressure by forcing air to flow slowly through the probe pipe.
 - d. Add air to the plugged pipe sections under test until internal air pressure reaches 4.0 psig greater than any groundwater hydrostatic pressure.
 - e. Allow at least two minutes for air temperature to stabilize and adding air to maintain the initial test pressure.
 - f. Shut off the air supply after stabilizing the air temperature and record the time in seconds using an approved stopwatch for the internal pressure to drop from 3.5 psig to 2.5 psig greater than any groundwater hydrostatic pressure.
 - g. Allowable limits: Total rate of air loss not to exceed 0.0030 cubic feet of air per minute per square foot of internal pipe area.
 - h. If the air test fails to meet these requirements, locate and repair, or remove and replace the faulty sections of pipe in a manner approved by the Engineer, as necessary to meet the allowable limits upon retesting.
- 3. Do not use acrylamid gel sealant to correct leakage.
 - 4. Provide and use measuring devices approved by the Engineer.
 - 5. Provide materials, and labor for making required tests.
 - 6. Make tests in the presence of the Engineer, giving the Engineer at least three days advance notice of being ready for test observation.

3.9 WATER SYSTEM DISINFECTION

- A. General:
 - 1. After the potable water system has been satisfactorily completed and tested, disinfect the work in accordance with AWWA C651, and "Standard Specifications for Sewer and Water Construction in Wisconsin".
- B. Forms of applied chlorine:
 - 1. Apply chlorine by the dry gas feeder unless solution feed chlorination, solution of chlorine-bearing compounds, or tablet method are approved by the Owner.
 - a. Provide effective diffusion of the gas into the water within the water main and regulating the rate of gas flow.
 - b. Provide means for preventing the backflow of water into the chlorinator.
 - 2. Chlorine-bearing compounds in water:
 - a. Apply solution of calcium hypochlorite granular or sodium hypochlorite into one end of the section of main to be disinfected while filling the main with water.
 - 3. Tablet method:
 - a. Apply tablet of calcium hypochlorite to short extensions only.
 - b. Utilize only when scrupulous cleanliness has been used in construction.

- c. Do not use if trench water or foreign material has entered the water piping or if the water is below 41 degrees F. Place tablets at the top of the main and attach by an adhesive, such as Permatex No. 1.
- d. Place crushed tablets inside the annular space of the pipe joints.

C. Requirement of chlorine:

- 1. Apply disinfecting solutions having at least 50 mg/l of available chlorine.
- 2. Retain the disinfecting solutions in the work for at least 24 hours.
- 3. Chlorine residual after the retention period: At least 25 mg/l.

D. Flushing and testing:

- 1. Following chlorination, flush treated water thoroughly from the water system until the chlorine concentration in the water flowing from the system is no higher than generally prevailing in the Owner's system, or less than 1 mg/l.
- 2. After flushing, the Owner will collect two samples on successive days at least 24 hours apart in sterile bottles treated with sodium thiosulfate. Notify the Engineer and Owner when leakage testing is complete and schedule the time for sample collection with the Owner. Provide materials and support to the Owner in collection of samples.
- 3. The Owner will deliver the samples to a state approved laboratory for bacteriological analysis.
- 4. Should the initial disinfection result in an unsatisfactory bacterial test, repeat the chlorination procedure until satisfactory results are obtained.
- 5. The Owner will provide the water for initial flushing and testing only. Compensate the Owner for water used in subsequent flushing and testing.

E. Swabbing:

- 1. Flush and swab the piping, valves, and fittings that must be placed in service immediately and cannot be disinfected by the above specified methods, with five percent solution of calcium hypochlorite prior to assembly.
 - a. Secure the Engineer's approval before applying this method of disinfection.

3.10 DECHLORINATION

- A. Comply with AWWA C651-05 requirements to neutralize the residual chlorine in new water mains.
- B. After new water mains have passed disinfection requirements, utilize portable diffusing dechlorinators that utilize sulfur dioxide or other chemicals listed in Appendix C of AWWA C651 to lower chlorine residuals prior to discharge to the drainage system.
 - 1. Lower concentration to 1 mg/l or less.

END OF SECTION

SECTION 22 19 23

VALVES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide valves as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
 - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
 - 1. General dimensions, construction details, and manufacturer's specifications.
- B. Operation and Maintenance Manuals – Submit operation and maintenance manuals in compliance with pertinent provisions of Section 01 78 26.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

1.3 QUALITY ASSURANCE

- A. Provide valves of same type by same manufacturer to greatest extent possible.
- B. Provide valves with manufacturer's name and pressure rating clearly marked on valve body.
- C. Ensure all brass and bronze alloys contain less than maximum allowable percent zinc.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 GATE VALVES

- A. Gate valves smaller than 3-inch size:
 - 1. Provide bronze body, wedge disc, screwed bonnet, non-rising stem, threaded-end type with handwheel.
 - 2. Valves designed for 300-pound non-shock W.O.G.
- B. Open all gate valves by turning in counterclockwise direction.

2.2 BUTTERFLY VALVES

- A. General:
 - 1. Provide resilient seated type designed for a minimum water working pressure of 150 psi and a maximum temperature rating of 180 degrees F.
 - 2. Design to meet or exceed AWWA C504 for pressure Class 150B.
 - 3. Valve body of one piece cast iron.
 - 4. Valve shafts of 18-8 Type 304 stainless steel and one-piece design.
 - 5. Valve discs of Ni-Resist cast iron alloy, or ductile iron, or ASTM A48, Class 40 cast iron attached to the shaft with solid stainless steel pins or equal, to prevent slippage or misalignment.
 - 6. Valve shaft seals designed for the use of split-V type packing, for O-ring seals or for a pull-down packing.
 - a. Design seals to be replaceable without dismantling the valve.
 - 7. Corrosion resistant, self-lubricating valve shaft bearings.
 - 8. Rubber valve seats designed to provide tight shutoff with 150 psi upstream pressure and zero psi downstream pressure.
- B. Butterfly valves installed in non-submerged flanged piping:
 - 1. ANSI Class 125 standard flange.
 - 2. Manual crank or handwheel operated enclosed mechanical type actuator for operation with maximum of 40 pounds of force for valves 10-inch size and smaller and 50 pounds of force for valves 12-inch size or larger unless otherwise shown on the Drawings.
 - a. Rotate gear operator as required to prevent oil leakage and provide for ease of operation for piping arrangement.
 - b. Install valve such that the valve seat will be vertical when open and in line with the vertical plane of any adjacent or nearby 90 degree pipe elbow bend.
- C. Provide fully enclosed manual operators for submerged or underground valves, gasketed, grease lubricated, and sealed for the life of the valve.
 - 1. Stainless steel exposed nuts, bolts, springs, and washers.
- D. Acceptable manufacturers:
 - 1. Kennedy.
 - 2. Mueller.
 - 3. DeZurik.

4. Pratt.

2.3 CHECK VALVES

- A. Swing check valves 2-inch size and smaller:
 - 1. Bronze body, composition disc, threaded end type rated 200 psi W.O.G.
- B. Swing Flex check valves larger than 2 inches:
 - 1. Ductile Iron body, Buna-N disc, exterior and interior fusion bonded epoxy coating, with the following:
 - a. Nema 4 Disc position indicator to indicated open/closed, with 120 volt limit switch with signal back to SCADA.
 - b. Minimum non-shock cold water pressure rating 150 psi.
- C. Acceptable manufacturers:
 - 1. Swing Flex Check Valves:
 - a. Val-Matic Swing Flex Check Valve Series #500.
 - b. Or equal.

2.4 HOSE VALVES

- A. Provide compression type valves with brass or bronze body, bonnet, stem and disc holder, rubber composition disc, removable wheel or tee handle, and 3/4-inch standard garden hose thread outlet connection.
 - 1. 3/8-inch steel or brass operating rod and black steel or copper tube casing on frost-proof valves.
 - 2. Equip each hose valve with an isolation valve and vacuum breaker similar to Watts No. 8A, or equal.

2.5 SAMPLING FAUCETS

- A. Provide smooth nose sampling faucet consisting of a downturned 1/4-inch copper pipe elbow of 4-inch length suitable for bacteriological sampling and flaming, connected to 1/2-inch pipe inlet connection and isolation valve with lever handle.

2.6 AIR RELEASE VALVES

- A. Provide cast iron body and cover, stainless steel float, Buna-N seat, and 1/2-inch threaded inlet with isolation valve and screened discharge piping.
- B. Acceptable products:
 - 1. APCO Model 55.
 - 2. Val-Matic Model 22.
 - 3. Or equal.

2.7 BALL VALVES

- A. Brass ball valves:
 - 1. Provide 2-inch and smaller, 2-way, ball valves for use with 2-inch and smaller tube and piping systems.
 - a. Body: Brass.
 - b. Ball stem, packing washers, seat retainers, and ball retainers: Brass.
 - c. Port adapters, packing nut: Brass.
 - d. Handle: Nylon.
 - e. Ball seat: Teflon.
 - f. Adapter and retainer seals: Teflon.
- B. Stainless steel ball valves:
 - 1. Provide Victaulic Series 569, Vic-Press 316 Type 316 stainless steel ball valves.

2.8 PAINTING

- A. Comply with the pertinent provisions of Section 09 90 00.

PART 3 - EXECUTION

- 3.1 Install valves in accordance with manufacturer's recommendations and as noted in these specifications.
- 3.2 Locate sampling tap over raised funnel drain line.
- 3.3 Route air release discharge piping to drain and terminate 24 inches above floor. Provide 24 mesh stainless steel screen over end of pipe.

END OF SECTION

SECTION 22 19 26

GAUGES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide gauges as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
 - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
 - 1. General dimensions and manufacturer's specifications.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

1.3 QUALITY ASSURANCE – Reserved.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide gauges with ranges shown on the Drawings and/or specified herein.

2.2 BOURDON TUBE TYPE PRESSURE GAUGES

- A. Provide phosphor bronze tube, brass socket, 4½-inch aluminum alloy case, white dial, and plastic glass lens.
 - 1. Provide 1/4-inch gauge cock and stainless steel cartridge snubber for each gauge.
 - 2. Provide two, 0 to 30 psi gauges for suction side of booster pumps.
 - 3. Provide two, 0 to 100 psi gauges for discharge side of booster pumps.
- B. Provide ACCO Helicoid Type 410, or H.O. Trerice Company 500X, or equal.

PART 3 - EXECUTION

- 3.1 Install gauges and accessories in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 22 19 43
PLUMBING AND FIXTURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide plumbing as shown on the Drawings, as specified herein, and as needed for a complete and proper installation including, but not necessarily limited to:
 - 1. Building hot and cold water piping systems.
 - 2. Drain, waste, and vent systems.
 - 3. Plumbing fixtures and trim.
- B. References:
 - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
 - 1. Manufacturer's specification catalog cuts for water heaters.
- B. Operation and Maintenance Manuals: Submit operation and maintenance manuals in compliance with pertinent provisions of Section 01 78 26 for water heaters.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.
- F. Comply with pertinent provisions of Section 01 33 01.

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Codes and regulations:
 - 1. In addition to complying with the specified requirements, comply with pertinent regulations of governmental agencies having jurisdiction.
 - 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.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 PIPE SCHEDULE

- A. Drain, waste, and vent system:
 - 1. For sanitary work below the floor and outside underground:
 - a. Provide PVC pipe and fittings unless otherwise shown on the Drawings.
 - 2. For inside building:
 - a. Provide plastic drainage pipe and fittings unless otherwise shown on the Drawings.
- B. Potable water system (hot and cold water piping): as shown on the Drawings.
 - 1. Inside building:
 - a. Hot water piping: Provide insulation for all piping. This requirement also applies to attic areas above ceilings.
 - b. Tempered and cold water piping: Provide insulation for exposed water piping in areas that are not heated and/or dehumidified. This requirement also applies to attic areas above ceilings.
- C. Indirect drains (gland drain, etc.):
 - 1. Provide Schedule 40 black steel pipe with malleable iron screwed fittings; except provide galvanized where pipe or fittings are exposed to the weather.
 - 2. Size lines to match equipment connections.

2.2 PIPE AND FITTING MATERIALS

- A. Comply with Section 22 19 13.

2.3 VALVES

- A. Comply with Section 22 19 23.

2.4 FIXTURES

- A. Floor drains:
 - 1. Provide cast iron standard 3-inch spigot outlet type, 9-inch x 9-inch top size with loose strainer, Tyler Series 300-TY, or equal.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 PLUMBING SYSTEM LAYOUT

- A. Lay out the plumbing system in careful coordination with the Drawings, determining proper elevations for all components of the system and using only the minimum number of bends to produce a satisfactorily functioning system.
- B. Follow the general layout shown on the Drawings in all cases except where other work may interfere.
- C. Lay out pipes to fall within partition, wall, or roof cavities, and to not require furring other than as shown on the Drawings.

3.3 INSTALLATION OF PIPING AND EQUIPMENT

- A. General:
 - 1. Comply with Section 22 19 13 for pipe installation, support, testing, and/or disinfection.
 - 2. Thoroughly clean items before installation. Cap pipe openings to exclude dirt until fixtures are installed and final connections have been made.
 - 3. Run horizontal sanitary and storm drainage piping at a uniform grade of 1/4-inch per foot, unless otherwise noted. Run horizontal water piping with an adequate pitch upwards in direction of flow to allow complete drainage.
 - 4. Pipe the drains from pump glands, drip pans, relief valves, air vents, and similar locations, to spill over an open sight drain, floor drain, or other acceptable discharge point, and terminate with a plain end unthreaded pipe 6 inches above the drain.
 - 5. Securely bolt all equipment, isolators, hangers, and similar items in place.
 - 6. Support each item independently from other pipes. Do not use wire for hanging or strapping pipes.
 - 7. Provide complete dielectric isolation between ferrous and non-ferrous metals.
 - 8. Provide union and shut off valves suitably located to facilitate maintenance and removal of equipment and apparatus.
 - 9. Install 1/4-inch bronze cock with 1/4-inch copper tubing return manual air vents at the high points of all pipelines carrying water of any service class which cannot be vented through service connections or vent cocks provided with equipment.

- B. Equipment access:
 - 1. Install piping, equipment, and accessories to permit access for maintenance. Relocate items as necessary to provide such access, and without additional cost to the Owner.
 - 2. Provide access doors where valves, motors, or equipment requiring access for maintenance are located in walls or chases or above ceilings. Coordinate location of access doors with other trades as required.

3.4 PLUMBING FIXTURE INSTALLATION

- A. Installation:
 - 1. Set fixtures level and in proper alignment with respect to walls and floors, and with fixtures equally spaced.
 - 2. Provide supplies in proper alignment with fixtures and with each other.
 - 3. Provide flush valves in alignment with the fixture, without vertical or horizontal offsets.
- B. Grout wall and floor mounted fixtures watertight where the fixtures are in contact with walls and floors.
- C. Caulk deck-mounted trim at the time of assembly, including fixture and casework mounted. Caulk self-rimming sinks installed in casework.

3.5 OTHER TESTING AND ADJUSTING

- A. Provide personnel and equipment, and arrange for and pay the costs of, all required tests and inspections required by governmental agencies having jurisdiction.
- B. Where tests show materials or workmanship to be deficient, replace or repair as necessary, and repeat the tests until the specified standards are achieved.
- C. Adjust the system to optimum standards of operation.

END OF SECTION

SECTION 26 05 19

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide low-voltage electrical power conductors and cables as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
 - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

1.3 QUALITY ASSURANCE

- A. Comply with the following requirements:
 - 1. NFPA 70 National Electrical Code (NEC).
 - 2. Local codes and ordinances.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Comply with the following standards:
 - 1. UL 83 and ICEA S-61-402 for thermoplastic insulated wire and cable.
 - 2. UL 44, ICEA S-19-81 and ICEA S-66-524 for rubber or rubber-like and cross-linked thermosetting polyethylene insulated wire and cable.

- B. Provide copper wire only.

2.2 WIRE AND CABLE IN RACEWAY

- A. Power, light, and control conductors:
 - 1. Insulation: Rated for 600 volts.
 - a. Use dual rated type THHN/THWN in temperature controlled indoor locations.
 - b. Use Type XHHW in underground locations and unheated concrete structures.
 - 2. Use stranded wire for control conductors.
- B. Variable Frequency Drive (VFD) Multi-conductor cable:
 - 1. Conductor: 3C-7 strand copper conductors to ASTM B8.
 - 2. Insulation: 600V, flame retardant, cross-linked polyethylene (FR XLPE), 90 degrees C, wet/dry (UL44) XHHW-2.
 - 3. Grounding conductors: 3 stranded bare copper grounds symmetrically located in continuous contact with a copper tape shield.
 - 4. Shielding: Dual copper tape shields helically wound with 50% overlap.
 - 5. Assembly: 3 phase conductors with symmetrically located tri-sectional grounding conductors in continuous contact with a copper tape shield.
 - 6. Overall jacket: 90C-25C flame retardant yellow PVC LAG (Low Acid Gas) sunlight resistant.
 - 7. Temperature: 90 degree C wet/dry.
 - 8. Voltage class: 600 volts.
 - 9. Approvals: IEEE 383, 70,000 BTU flame test; UL 1277 and UL 1581; tray cable rated (TC).
 - 10. Manufacturer:
 - a. Anixter-Shawflex VFD Cable.
 - b. Belden VFD Cable.
 - c. Or equal.

2.3 JOINTS, TAPS, SPLICES, AND TERMINATIONS

- A. Conductors No. 10 AWG and smaller: Use twist type insulated wire nut solderless connectors.
- B. Conductors No. 8 AWG and larger: Use solderless compression type connectors of type that will not loosen under vibration or normal strains.
- C. Control and instrumentation conductors: Use crimp type spade connectors where control wires are connected to screw terminals of equipment.
- D. Joints, taps, and splices located in enclosures subject to moisture: Use watertight splice kits.

2.4 PERMANENT WIRE MARKERS

- A. Provide type-on, self-laminating vinyl, heat shrink polyolefin or nylon clip-sleeve, alpha-numeric, permanent wire markers.
 - 1. Use fine-line, black, permanent ink pens where field marking is necessary.
 - 2. Cloth tags are not acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install wiring system in accordance with manufacturer's recommendations.
- B. Install wire and cable in conduit unless otherwise shown on the Drawings.
- C. Maintain barrier or conduit separation between power conductors and instrumentation conductors to avoid magnetic interaction where such conductors enter and pass through same box, or enclosure.

3.2 WIRE AND CABLE IDENTIFICATION

- A. Install permanent wire markers on wire and cable in junction boxes, pull boxes, wireways, and wiring gutters of panels. Markers to identify wire or cable number.
- B. Provide schedule identifying various power and lighting conductors from power source to equipment or device served.

END OF SECTION

SECTION 26 05 23

CONTROL-VOLTAGE ELECTRICAL POWER CABLES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide control-voltage wires, cables, and connectors as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
 - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

1.3 QUALITY ASSURANCE

- A. Comply with the following requirements:
 - 1. NFPA 70 National Electrical Code (NEC).
 - 2. Local codes and ordinances.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Comply with the following standards:
 - 1. UL 83 and ICEA S-61-402 for thermoplastic insulated wire and cable.
 - 2. UL 44, ICEA S-19-81 and ICEA S-66-524 for rubber or rubber-like and cross-linked thermosetting polyethylene insulated wire and cable.

- B. Provide copper wire only.

2.2 WIRE AND CABLE

- A. Shielded instrumentation cable:
1. Conductors: Stranded No. 18 AWG tinned copper.
 2. Insulation: Polyethylene or fluorinated ethylene propylene (FEP), color coded, rated for 300 volts.
 3. Jacket: Polyvinyl chloride or FEP.
 4. Shielding: Aluminum polyester, 100 percent coverage.
 - a. Includes stranded No. 20 AWG tinned copper drain wire.
 5. Provide Belden, or equal, copper instrumentation cable systems:
 - a. For 2-conductor requirements:
 - (1) Belden No. 8760 suitable for outdoor.
 - (2) Belden No. 88760 suitable for outdoor & burial.
 - b. For 3-conductor requirements:
 - (1) Belden No. 8770 suitable for outdoor.
 - (2) Belden No. 88770 suitable for outdoor & burial.
 - c. For 2-twisted pair requirements: Belden No. 9552.
 6. UL Listed for use.
 7. Provide shielded instrumentation cable suitable for flooded burial and freeze/thaw conditions where installed in duct banks, underground conduits, or conduits in and on unheated structures.
- B. Multi-conductor shielded instrumentation cable:
1. Conductors: Stranded No. 16 or 18 AWG tinned copper.
 2. Insulation: Flame-retardant ethylene propylene rubber (EPR) Type II or cross-linked polyethylene (XLPE). Color code per ICEA Method 1; pair – black & white. One conductor in each pair is printed alpha-numerically for easy identification.
 3. Shield: Individual pairs shielded with aluminum/polyester in contact with stranded tinned copper drain wire and overall shielded is aluminum/polyester in contact with stranded tinned copper drain wire.
 4. Outer jacket: Flame-retardant thermoplastic chlorinated polyethylene (CPE).
 5. Volts: 300V or 600V.
 6. Conductors: Class B stranding per ASTM B8, tinned annealed copper per ASTM B33.
 7. Application: In free air, raceways or direct burial in accordance with NEC. Permitted for use in Class I Div. 2 industrial hazardous locations per NEC Article 501-4(b) for UL Type PLTC cables.
 8. Acceptable manufacturers:
 - a. General Cable.
 - b. Omni Cable.
 - c. Or equal.

- C. Multi-conductor thermostat cable, low voltage:
1. Conductors: Solid No. 18 AWG copper.
 - a. Minimum of 4 conductors per cable.
 2. Insulation and jacket: Polyvinyl chloride, color coded, UL listed for use, rated for circuits operating at less than 50 volts.
- D. Telephone cable:
1. Conductors: Solid No. 24 AWG tinned copper.
 - a. Minimum of 4 twisted pairs per cable.
 2. Insulation and jacket: Polyvinyl chloride, color coded, UL listed for use.
- E. Data cables:
1. Verify unique cable requirements of individual data systems shown on Drawings with Systems Integrator.
 2. Provide Belden, or equal, copper data cable systems:
 - a. DeviceNet Applications:
 - (1) No. 3083A CPE (Thick).
 - (2) No. 3085A CPE (Thin).
 - (3) No. 3082A PVC (Thick).
 - (4) No. 3084A PVC (Thin).
 - b. ControlNet Applications:
 - (1) No. 3092A RG-6 PVC Quad shield coax suitable for outdoor.
 - (2) No. 3093A RG-6 FEP Quad shield coax, plenum, suitable for outdoor & burial.
 - c. E/IP application:
 - (1) No. 7933A Cat 5e – 2 pair, bonded, shielded.
 - (2) No. 7929A Cat 5e – 4 pair, bonded, stranded, shielded.
 - (3) No. 7937A Cat 5e – 4 pair, bonded, shielded, burial.
 - d. Profibus DP Applications:
 - (1) No. 3079A 22AWG 300V Twinax.
 - (2) No. 3079E 22AWG 300V Twinax, Flex Version.
 - e. Modbus application:
 - (1) No. 8777 22 AWG, 3 pair modem drop cable.
 3. Provide data cable suitable for flooded burial and freeze/thaw conditions where installed in duct banks, underground conduits, or conduits in and on unheated structures.
 4. Provide data cables UL listed for intended use.
- F. Fiber optic cables:
1. Number of fibers in cable: 6 fibers.
 2. Type of fiber (optical): 50/125/250 micron Multimode.
 3. Insulation and jacket:
 - a. Polyethylene (PE).
 - b. Polyvinyl chloride (PVC).
 - c. Polybutylene terephthalate (PBT).
 4. Storage and operating properties: -50 to +70 deg C.
 5. Rated for both indoor and outdoor application and burial in conduit.
 6. Flame resistance UL 1666.
 7. Gel filled, loose tube construction.
 8. Maximum installation bend radius: 7.6".

9. Acceptable manufacturer:
 - a. Belden No. M9A510T.
 - b. Or equal.

2.3 JOINTS, TAPS, SPLICES, AND TERMINATIONS

- A. Conductors No. 10 AWG and smaller: Use twist type insulated wire nut solderless connectors.
- B. Control and instrumentation conductors: Use crimp type spade connectors where control wires are connected to screw terminals of equipment.
- C. Joints, taps, and splices located in enclosures subject to moisture: Use watertight splice kits.

2.4 PERMANENT WIRE MARKERS

- A. Provide type-on, self-laminating vinyl, heat shrink polyolefin or nylon clip-sleeve, alpha-numeric, permanent wire markers.
 1. Use fine-line, black, permanent ink pens where field marking is necessary.
 2. Cloth tags are not acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install wiring system in accordance with manufacturer's recommendations.
- B. Install wire and cable in conduit unless otherwise shown on the Drawings.
- C. Maintain barrier or conduit separation between power conductors and instrumentation conductors to avoid magnetic interaction where such conductors enter and pass through same manhole, handhole, casing pipe, box, or enclosure.
- D. Run instrumentation conductors into control cabinets or MCC only if terminated therein. Maintain separation of power and instrumentation conductors inside cabinets.
- E. Provide individual wiring compartments or barrier for separation between intrinsically safe and non-intrinsically safe conductors inside enclosures.

3.2 WIRE AND CABLE IDENTIFICATION

- A. Install permanent wire markers on wire and cable in junction boxes, pull boxes, wireways, and wiring gutters of panels. Markers to identify wire or cable number.
- B. Provide schedule identifying various control and instrumentation circuit conductors based on equipment tag numbers.

END OF SECTION

SECTION 26 05 29

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide hangers and supports as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
 - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

1.3 QUALITY ASSURANCE

- A. Comply with the following requirements:
 - 1. NFPA 70 National Electrical Code (NEC).
 - 2. Local codes and ordinances.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide zinc galvanized, cadmium plated steel, or malleable iron supporting devices.
- B. Provide drilled expansion insert type sleeve anchors, lag shields, or plastic anchors suitable for load and application.

2.2 CONDUIT SUPPORTS

- A. Provide one-hole or two-hole conduit straps as required.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install supporting devices in accordance with manufacturer's recommendations.
- B. Do not use perforated hanger iron.

END OF SECTION

SECTION 26 05 33

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide raceway and boxes as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
 - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

1.3 QUALITY ASSURANCE

- A. Comply with the following requirements:
 - 1. NFPA 70 National Electrical Code (NEC).
 - 2. Local codes and ordinances.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide conduit system of the types of conduit as indicated in the Conduit Usage Schedule in Part 3 of this Section.
- B. Provide PVC boxes where non-metallic conduit system is used.

2.2 METAL RACEWAY AND FITTINGS

- A. Galvanized rigid steel conduit (GRC) and fittings:
 - 1. Conduit: Comply with ANSI C80.1 and UL 6 standards.
 - 2. Fittings: Comply with UL 514B and NEMA FB1 & FB2.10 standards.
- B. Electrical metallic tubing (EMT) and fittings:
 - 1. Conduit: Comply with ANSI C80.3 and UL 797 standards.
 - 2. Fittings: Comply with UL 514B and NEMA FB1 & FB2.10 standards.

2.3 FLEXIBLE METAL RACEWAY AND FITTINGS

- A. Liquidtight, flexible metal conduit and fittings:
 - 1. Conduit: Comply with UL 360 standards.
 - a. Galvanized flexible steel core.
 - b. Provide outer liquidtight, PVC sunlight resistant jacket.
 - 2. Fittings: Comply with UL 514B and NEMA FB1 standards.

2.4 CONDUIT BODIES

- A. Metallic conduit bodies:
 - 1. Comply with ANSI C80.4 and C33.84, and UL 514 standards.
 - a. Use galvanized or cadmium plated malleable iron, or copper-free aluminum material.
- B. Provide removable cover with gasket and corrosion-resistant screws.

2.5 FLEXIBLE SEALING COMPOUND

- A. Use Panduit DS-5 duct sealing compound, or equal, where air and vaportight conduit sealing is required.

2.6 OUTLET BOXES AND JUNCTION BOXES

- A. Surface mounted: Provide corrosion-resistant single or multiple gang malleable iron or aluminum Type FS or FD cast boxes with threaded hubs, or pressed steel boxes as permitted under Part 3 of this Section.
- B. Weatherproof boxes: Provide gasketed covers and corrosion-proof fasteners.

PART 3 - EXECUTION

3.1 INSTALLATION - RACEWAY

- A. Install conduit and fittings in accordance with manufacturer's recommendations.
- B. Run exposed conduits parallel to or at right angles with lines of building or structure.
- C. Route conduit runs above suspended panel ceilings so as not to interfere with panel removals unless otherwise indicated on the Drawings.
- D. Keep conduit plugged, clean and dry during construction.

3.2 INSTALLATION – BOXES

- A. Install boxes in accordance with manufacturer's recommendations.
- B. Use weatherproof boxes for interior and exterior locations exposed to weather or moisture.
- C. Set outlet boxes parallel to construction.
- D. Thoroughly clean boxes prior to installing wiring devices.

3.3 CONDUIT USAGE SCHEDULE

- A. Install EMT or GRC for exposed horizontal runs higher than 8 feet above the floor.
- B. Install GRC for exposed runs lower than 8 feet above the floor.

3.4 EXPOSED OUTLET AND JUNCTION BOXES

- A. Use cast boxes up to 45 inches above floor.
- B. Pressed steel boxes acceptable over 45 inches above floor in dry, indoor locations.
- C. Install weatherproof outlet, switch, and junction boxes outdoors and in any area where Drawings show weatherproof (WP) wiring devices.

3.5 OUTLET BOX ACCESSORIES

- A. Provide outlet box accessories and mounting devices as required for each installation.

END OF SECTION

SECTION 26 05 36

CABLE TRAYS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide cable tray system as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.

1.2 QUALITY ASSURANCE

- A. Comply with the following requirements:
 - 1. NFPA 70 National Electrical Code (NEC).
 - 2. Local codes and ordinances.
 - 3. NEMA VE1 standards.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

PART 2 - PRODUCTS

2.1 CABLE TRAY SYSTEM

- A. Provide cable tray system as follows:
 - 1. Ventilated type:
 - a. Consists of longitudinal rails and a bottom having openings for the passage of air and utilizing 75 percent or less of the plan area of the surface to support cables.
 - b. Maximum open spacings between cable support surfaces of transverse elements must not exceed 4 inches in the direction parallel to the tray side rails.
 - 2. Material: Steel, hot dip galvanized after fabrication.
 - 3. Dimensions:
 - a. Standard height and width.
 - b. Standard lengths cut to size and all sections joined together to form assembly as shown on the Drawings.
 - 4. Horizontal radius section as shown on the Drawings.
 - 5. Sections joined together with manufacturer's standard splice plates and zinc plated hardware.
 - 6. Manufacturer's standard clamps and zinc plated hardware for clamping cable tray assembly to top of trapeze supports and for attachment of metal conduits to cable tray assembly.
 - 7. Bonding/grounding clamps/fittings as required.

- B. Suspend cable tray system at elevations shown on the Drawings from ceiling structure with trapeze supports consisting of galvanized steel channel, ½-inch threaded hanging rods and plated hardware.
 - 1. Horizontal spacing of trapeze supports as shown on the Drawings.
- C. Fasten bundled cables and wires to cable support surfaces of tray with plastic cable ties where necessary to maintain spacings as shown on the Drawings.
- D. Acceptable manufacturers:
 - 1. Thomas & Betts.
 - 2. Chalfant.
 - 3. Or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install cable tray system in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 26 05 53

IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide identification for electrical systems as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
 - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

1.3 QUALITY ASSURANCE – Reserved.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 NAMEPLATES AND TAGS

- A. Provide nameplates or tags for identification of panels, panel components, and field mounted devices with the following requirements.
 - 1. Engraved laminated plastic.
 - 2. White or black letters on background of opposite color. Match and coordinate color of nameplate or tag background with other panels.
- B. Panel nameplates to have 1/2-inch high letter engraving.
- C. Device and component nameplates or tags to have 3/16-inch high letter engraving.

IDENTIFICATION FOR ELECTRICAL SYSTEMS

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- D. Engravings include the following:
 - 1. Alpha-numeric number.
 - 2. Descriptive title.
 - 3. Range, where applicable.
 - 4. Engineering units, where applicable.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install nameplates and tags on enclosures, panel mounted components, and field mounted devices.

END OF SECTION

SECTION 26 09 95

PUSHBUTTONS, SELECTOR SWITCHES, AND PILOT LIGHTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide pushbuttons, selector switches, and pilot lights as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
 - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
 - 1. Manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts:
 - 1. Two (2) pilot light lamps of each type.

1.3 QUALITY ASSURANCE

- A. Comply with the following requirements:
 - 1. NFPA 70, National Electrical Code (NEC).
 - 2. Local codes and ordinances.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide oil-tight, heavy duty NEMA 4 rated pushbutton switches, selector switches, and pilot lights.
- B. Provide all devices with legend plates.
 - 1. Material: Non-tarnish metal or laminated plastic.
 - 2. Use white or black letters on background of opposite color for laminated plastic.
- C. Use two-circuit contact blocks (one N.O. and one N.C. contact set) for pushbutton switches and selector switches.

2.2 PUSHBUTTON SWITCHES

- A. Stop pushbuttons:
 - 1. Provide non-illuminated momentary operation type operators.
 - 2. Use red color button.
- B. Start pushbuttons:
 - 1. Provide non-illuminated momentary operation type operators.
 - 2. Use black color button.
- C. Stop-hold switches:
 - 1. Use stop pushbutton as specified above.
 - 2. Include sliding latch with padlock provision to engage stop button in the OFF position.
- D. Provide pushbuttons for other functions as shown on the Drawings.

2.3 SELECTOR SWITCHES

- A. Provide selector switches including the operating knob, operating cam and contact block(s).
- B. Use black color operating knob.
- C. Select operating cam and contact block combination to provide operating sequence as required.

2.4 PILOT LIGHTS

- A. Provide pilot lights with colored plastic lens as shown on the Drawings.
- B. Provide 120 volt or 24 Vdc, push-to-test type with LED lamp.

2.5 ENCLOSURES

- A. Provide for individual remote control or monitor stations the following type enclosure:
 - 1. Indoor locations: NEMA 1.
 - 2. Outdoor or wet locations: NEMA 3R or NEMA 4 steel construction.
 - 3. Corrosive locations: NEMA 4X stainless steel construction.
 - 4. Hazardous locations: NEMA 7/9 cast iron, or copper free cast aluminum alloy.

- B. Provide nameplate on enclosure for device being controlled.
 - 1. Provide engraved laminated plastic type.
 - 2. Use 3/16-inch high white or black letters on background of opposite color.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install pushbutton switches, selector switches, and pilot lights in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 26 22 13

LOW VOLTAGE DISTRIBUTION TRANSFORMERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide transformers as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
 - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
 - 1. Physical dimensions, nameplate data, electrical ratings, and manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

1.3 QUALITY ASSURANCE

- A. Comply with the following requirements:
 - 1. NFPA 70 National Electrical Code (NEC).
 - 2. Local codes and ordinances.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 CONTROL TRANSFORMERS

- A. Provide UL listed transformers designed to handle high in-rush currents associated with contactors and relays.
- B. Provide continuous VA rating: Size for 1.25 times capacity required for all components in circuit.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install transformers in accordance with manufacturer's recommendations.

END OF SECTION

SECTION 26 24 19.13

MOTOR-CONTROL CENTER MODIFICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide modifications to motor control center (MCC) as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
 - 1. Section 26 28 00.60, Owner Provided Low-Voltage Circuit Protective Devices.
 - 2. Section 26 29 13.66, Owner Provided Reduced Voltage Motor Controllers.
 - 3. Section 26 29 23.60, Owner Provided Variable-Frequency Motor Controllers.
- C. References:
 - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
 - 1. Schematic diagrams for each compartment to be modified.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

1.3 QUALITY ASSURANCE

- A. Comply with the following requirements:
 - 1. NFPA 70 National Electrical Code (NEC).
 - 2. Local codes and ordinances.

1.4 DELIVERY, STORAGE, AND HANDLING – Reserved.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Install equipment furnished by Owner in existing Furnas System 89 MCC.
- B. Provide other equipment in MCC as follows:
 - 1. Motor contactors: Comply with Section 26 29 13.11.
 - 2. Control transformers: Comply with Section 26 22 13.
 - 3. Pushbuttons, selector switches and pilot lights: Comply with Section 26 09 95.
 - 4. Fuses: Comply with Section 26 28 00.
 - 5. Operating handles for well and booster pump circuit breakers:
 - a. Engaged with device at all times.
 - b. Up and down motion with down as OFF.
 - c. Interlocked with unit door.
 - d. Provisions for padlocking in off position.
 - 6. General purpose relays, time delay relays, timers and control relays: Comply with Section 40 95 92.
- C. Provide wiring in all MCC sections/units to be modified as follows:
 - 1. Provide color-coded wiring in accordance with applicable codes and laws to facilitate maintenance and repair. Post color-coding schedule inside the MCC section/unit.
 - 2. Provide minimum 16 AWG control wires and provide spiral wrap, tie wrap, fasteners and wire duct as required.
 - 3. Label all wiring at each end with numbers corresponding to the wiring schematics. Show numbering on the as-built drawings. Use tubular heat shrink-type or self-laminating vinyl wire markers printed using thermal printer.
 - 4. Label all terminal blocks with numbers corresponding to the wire numbers.
 - 5. Segregate wiring of different voltage levels.
 - 6. Provide nameplates for enclosure, instruments, devices and components. Descriptions on the nameplate to agree with the descriptions on the as-built drawings.
- D. Provide arc-flash hazard warning label on each hinged door of MCC:
 - 1. Comply with NEC 110.16.

END OF SECTION

SECTION 26 28 00.60

OWNER PROVIDED LOW-VOLTAGE CIRCUIT PROTECTIVE DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Install Owner provided Low-voltage circuit protective devices as specified herein, and as shown on drawings for a complete and functioning package. The Low-voltage circuit protective device equipment Provider will deliver equipment to site for installation by General Contractor, along with shop drawings, O&M Manuals and Two Year Warranty.
- B. Related work:
 - 1. Section 26 28 00, Low-Voltage Circuit Protective Devices.
- C. Owner Provided Low-Voltage Circuit Protective Devices are shaded in the PRODUCTS section of this specification. **Shaded product information noted in this specification is for the General/Installation Contractor's information only.** NOTE that other Low-Voltage Equipment is required to be provided and installed by this Contract.

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
 - 1. Electrical ratings, physical size, interrupt ratings, trip curves, I²t curves, and manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals – None Required.
- C. Lubricants – None Required.
- D. Spare Parts – None Required.

1.3 QUALITY ASSURANCE

- A. Comply with the following requirements:
 - 1. NFPA 70 National Electrical Code (NEC).
 - 2. Local codes and ordinances.
 - 3. Provide overcurrent protective devices by same manufacturer for each type of device.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.
- B. Provider of Low-voltage circuit protective devices equipment shall deliver the equipment to the project site complete and ready for installation within 10 weeks of

execution of contract to purchase. This time includes all submittal and approval requirements.

1.5 WARRANTY

- A. Provider of Low Voltage Equipment shall provide two year warranty against defective equipment in compliance with pertinent provisions of Supplementary Conditions.

PART 2 - PRODUCTS

2.1 MOLDED CASE CIRCUIT BREAKERS

- A. General:
1. Comply with UL 489 requirements.
 2. Provide thermal and magnetic protection.
 3. Provide certified factory original circuit breakers only. Remanufactured circuit breakers are not acceptable.
- B. Provide permanent trip MCC circuit breakers as follows:
1. Single magnetic trip adjustment.
 2. Bolt-on type.
 3. Short circuit rating (integrated equipment rating): 42,000 RMS symmetrical amps minimum.
- C. Provide one (1) circuit breaker and door to replace the existing main circuit breaker and door in the Furnas System 89 MCC incoming section at Unit Well 20 as follows:
1. The existing main circuit breaker is a Siemens Sentron Cat. No. MXD63S800A, 800-amp frame/800-amp trip, 80 percent rated, 3-pole with inverted connections (line lugs at bottom, load lugs at top).
 2. The replacement main circuit breaker is to be a Siemens Sentron Cat. No. MXD63B800H, 800-amp frame/800-amp trip, 100 percent rated, 3-pole with inverted connections (line lugs at bottom, load lugs at top).
 - a. Line lugs must each be listed for a minimum of 2 #500 kcmil copper service lateral wires.
 - b. Load lugs must each be listed for a minimum of 3 #3/0 copper wires.
 3. The replacement door is to be a Siemens Cat. No. D66501-678 having a padlock hasp and LOTO provisions.
 4. An Eaton/Cutler-Hammer circuit breaker and door having the same criteria as specified for the Siemens replacement circuit breaker and door will be the only acceptable substitution, provided such substitution is a direct replacement that will not necessitate any modifications to or in the existing MCC incoming section.

- D. Provide one (1) circuit breaker to replace the existing circuit breaker in the Furnas System 89 MCC well starter section at Unit Well 20 as follows:
 - 1. The existing circuit breaker is a Siemens Sentron Cat. No. LXD63H600, 700-amp frame/600-amp trip, 80 percent rated, 3-pole.
 - 2. The replacement circuit breaker is to be a Siemens Sentron Cat. No. MXD63B700, 800-amp frame/700-amp trip, 80 percent rated, 3-pole.
 - 3. An Eaton/Cutler-Hammer circuit breaker having the same criteria as specified for the Siemens replacement circuit breaker will be the only acceptable substitution.
 - a. Substitution circuit breaker must be provided with an operating handle having LOTO provisions unless its toggle is compatible with the existing Furnas operating handle.

- E. Provide two (2) circuit breakers for the replacement Booster Pump VFDs to be installed in sections 5 and 6 of the Furnas System 89 MCC at Unit Well 20 as follows:
 - 1. Siemens Sentron Cat. No. HFD63B150, F-frame, 150-amp trip, 80 percent rated, 3-pole.
 - 2. Eaton/Cutler-Hammer circuit breakers having the same criteria as specified for the Siemens circuit breakers will be the only acceptable substitution.
 - a. Each substitution circuit breaker must be provided with an operating handle having LOTO provisions unless its toggle is compatible with the existing Furnas operating handle.

PART 3 - EXECUTION

3.1 GENERAL

- A. Low-voltage circuit protective device equipment Provider shall deliver equipment to job site for installation by General Contractor. Coordinate delivery per General Contractor's construction schedule. Delivery shall include shipment to site and safe off-loading from delivery vehicle.

- B. Low-voltage circuit protective device equipment Provider shall provide an extended 2 year warranty covering defective parts on equipment to Owner at time of delivery.

3.2 INSTALLATION

- A. Install overcurrent protective devices in accordance with manufacturer's recommendations.

3.3 ADJUSTMENT

- A. Set and record adjustable settings on circuit breakers to provide selective coordination and proper operation.

END OF SECTION

SECTION 26 28 00

LOW-VOLTAGE CIRCUIT PROTECTIVE DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide overcurrent protective devices as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related work:
 - 1. Section 26 28 00.60, Owner Provided Low-Voltage Circuit Protective Devices.
- C. References:
 - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
 - 1. Electrical ratings, physical size, interrupt ratings, trip curves, I²t curves, and manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – Provide the following spare parts to the Owner that match items specified:
 - 1. In three phase circuits: Three (3) fuses of each type and rating.
 - 2. In single phase circuits: Two (2) fuses of each type and rating.

1.3 QUALITY ASSURANCE

- A. Comply with the following requirements:
 - 1. NFPA 70 National Electrical Code (NEC).
 - 2. Local codes and ordinances.
 - 3. Provide overcurrent protective devices by same manufacturer for each type of device.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 FUSES

- A. General purpose fuses for protection of motors, transformers, feeders, and main service:
1. Use UL Class RK-1 fuses:
 - a. Single end rejection or to fit mountings specified.
 - b. 0-600 ampere rating.
 - c. 200,000 ampere interrupting capacity.
 - d. Dual element, time delay.
 - e. Use Bussman Low Peak LPN-RK, or equal: 250 volt rating.
 - f. Use Bussman Low Peak LPS-RK, or equal: 600 volt rating.
 2. Use UL Class L fuses:
 - a. Bolt-in type.
 - b. 601-6,000 ampere rating.
 - c. 200,000 ampere interrupting capacity.
 - d. Time delay.
 - e. Use Bussman HI-CAP, KRP-C, or equal: 600 volt rating.
- B. General purpose fuses for protection of motor control circuits, lighting ballasts, control transformers, and street lighting fixtures:
1. Use UL Class CC, fast acting, single element fuses.
 2. Rated for 0-30 amperes.
 3. Provide 200,000 ampere interrupting capacity.
 4. Use Bussman Limitron KTK-R, or equal: 600 volt rating.

2.2 MOLDED CASE CIRCUIT BREAKERS

- A. General:
1. Comply with UL 489 requirements.
 2. Provide thermal and magnetic protection.
- B. Provide permanent trip lighting panel circuit breakers as follows:
1. UL listed SWD (switching duty) on 120 volt circuits where switched circuits are indicated.
 2. Short circuit rating (integrated equipment rating):
 - a. Up to 240 volt: 10,000 RMS symmetrical amps minimum.
 - b. Up to 480 volt: 14,000 RMS symmetrical amps minimum.
- C. Provide permanent trip power panel and MCC circuit breakers as follows:
1. Single magnetic trip adjustment.
 2. Bolt-on type.
 3. Short circuit rating (integrated equipment rating):
 - a. Main: 42,000 RMS symmetrical amps minimum.
 - b. Branch: 14,000 RMS symmetrical amps minimum.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install overcurrent protective devices in accordance with manufacturer's recommendations.

3.2 ADJUSTMENT

- A. Set and record adjustable settings on circuit breakers to provide selective coordination and proper operation.

END OF SECTION

SECTION 26 29 13.11
MOTOR CONTACTORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide input and isolation contactors as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
 - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
 - 1. Enclosure dimensions, nameplate data, electrical ratings and characteristics, wiring diagrams and manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals – Submit operation and maintenance manuals in compliance with pertinent provisions of Section 01 78 26, including the following:
 - 1. Documentation showing final configuration of each solid state (electronic) overload relay if applicable.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

1.3 QUALITY ASSURANCE

- A. Comply with the following requirements:
 - 1. NFPA 70 National Electrical Code (NEC).
 - 2. Local codes and ordinances.
- B. Provide all motor contactors of one manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide motor contactors as follows:
 - 1. In compliance with International-European (I.E.C.) standards.
 - 2. Non-reversing, 3-pole, open type.
 - 3. Rated for motor horsepower shown on the Drawings.
 - 4. Long life twin break, silver cadmium oxide contacts.
 - 5. Auxiliary contacts as required per motor control circuit.
 - 6. Coil rated for DC or AC voltage shown on motor control circuit.

- B. Acceptable manufacturers:
 - 1. Rockwell/Allen-Bradley.
 - 2. Eaton/Cutler-Hammer.
 - 3. No substitution permitted.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install motor contactors in accordance with manufacturer's recommendations.

- B. Coordinate electronic overload parameter settings with supplier of process control panels.

3.2 FIELD QUALITY CONTROL

- A. Conduct field tests prior to energization as follows:
 - 1. Megger check wire insulation levels (do not megger check solid state equipment).
 - 2. Record and provide results of tests to Engineer.

END OF SECTION

SECTION 26 29 13.66

OWNER PROVIDED REDUCED-VOLTAGE MOTOR CONTROLLERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Install Owner Provided Solid State Reduced Voltage Starters (SSRVS) as specified herein, and as shown on the drawings for a complete and functioning package. The Reduced-voltage motor control equipment Provider will deliver equipment to site for installation by General Contractor, along with shop drawings, O&M Manuals and Two Year Warranty.
- B. Owner Provided Reduced Voltage Motor Controller Devices are shaded in the PRODUCTS section of this specification. **Shaded product information noted in this specification is for the General/Installation Contractor's information only.**

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
 - 1. Dimensions, nameplate data, electrical ratings and characteristics, wiring diagrams and manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals – Submit operation and maintenance manuals in compliance with pertinent provisions of Section 01 78 26, including the following:
 - 1. Documentation showing final configuration of each SSRVS.
- C. Lubricants – None Required.
- D. Spare Parts – None Required.

1.3 QUALITY ASSURANCE

- A. Comply with the following requirements:
 - 1. NFPA 70 (latest edition) - National Electrical Code (NEC).
 - 2. Local codes and ordinances.
 - 3. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.
- B. Reduced-voltage motor control equipment Provider to deliver equipment to the project site, complete and ready for installation within 10 weeks of execution of contract to purchase. This time includes all submittal and approval requirements.

1.5 START UP SERVICES

- A. Comply with pertinent provisions of Section 01 91 58 regarding acceptance of installation.

1.6 WARRANTY

- A. Equipment Provider to provide two year warranty against defective equipment in compliance with pertinent provisions of Supplementary Conditions.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Design programmable microprocessor controlled SSRVS utilizing a thyristor (SCR) bridge consisting of at least two SCRs per phase to control starting and stopping of industry standard motors.
- B. Protect driven motor from solid state component failure by means of isolation contactor that opens when the motor is stopped or when the controller detects a fault condition including a shorted thyristor.
- C. All protective features and deceleration control options to be available even when a shorting contactor is employed.
- D. Provide one (1) SSRVS complete with all control modules and accessories (except circuit breaker to be procured separately) necessary to facilitate the replacement of the SSRVS in the existing Furnas System 89 well starter MCC section at Unit Well 20.
 - 1. The existing SSRVS is a Furnas Nordic 2000 rated 150-300 horsepower.
- E. Acceptable manufacturers:
 - 1. Rockwell/Allen-Bradley SMC Flex.
 - 2. No substitution permitted.

2.2 RATINGS

- A. Provide SSRVS with the following ratings:
 - 1. 200-400 horsepower.
 - 2. Ambient temperature range: 0 to 40 degrees C.
 - 3. Humidity: 93% @ 40 degrees C, non-condensing.
 - 4. Voltage tolerance: +/- 10% of nominal rating.
 - 5. Frequency tolerance: +/- 5% starting, +5% or -15% steady state operation.
 - 6. Capable of supplying 300% rated full load current for 30 seconds at maximum ambient temperature.
 - 7. SCR P.I.V. rating: 1400 VAC (minimum).

2.3 ADJUSTMENTS AND CONFIGURATIONS

- A. Provide accessibility to all display units, configuration switches and adjustment potentiometers on the front of the control module. Exposure to control circuit boards or electrical power devices during routine adjustments is prohibited.
- B. Provide digital indication of the following as a minimum:
 - 1. SSRVS status – ready, starting/stopping, run.
 - 2. Motor status – current, torque, thermal state, power factor.
 - 3. Fault status.
- C. Provide SSRVS with pump control option specifically designed to reduce surges during starting and stopping of centrifugal pumps.
- D. Provide SSRVS with motor braking option to stop motor faster than a coast to rest and to hold the shaft in place for a short duration after coming to rest.
 - 1. Strength of braking current to be programmable from 150-400 percent of full load current.
- E. Provide enclosure door mounted keypad (HIM Module) to configure the following operating parameters.
 - 1. Motor full load amps.
 - 2. Current limitation on starting.
 - 3. Torque ramp.
 - 4. Initial torque.
 - 5. Torque limit.
 - 6. Maximum start time.
 - 7. Selection of freewheel or soft stop.
 - 8. Adjustable soft stop torque ramp time.
 - 9. Selection of Class 10 and 20 motor thermal overload protection.

2.4 INPUTS AND OUTPUTS

- A. Provide the following output relays:
 - 1. One Form A and one Form B minimum for indication of fault or control of an isolation contactor.
 - 2. One Form A for indication that torque ramp is complete and current is below 130% motor FLA (End of start).
 - 3. One Form A for indication of FAULT status to remote Pump Control Panel.
- B. Provide the following additional I/O:
 - 1. One logic input for force to freewheel, indication of external fault, force to local control, or external motor overload reset.
 - 2. One analog output for 4-20 or 0-20 milliamp indication of motor current, torque, thermal state or power factor.
- C. Provide relay and I/O functions listed above isolated with respect to common.

2.5 PROTECTION

- A. Provide microprocessor controlled thermal protection system which continuously calculates the temperature-rise of the motor and SSRVS and provides:

1. An overload pre-alarm which indicates by relay contact that the motor has exceeded its rated temperature rise by 110%.
2. A thermal fault condition which stops the motor if the temperature-rise exceeds 120% of the motor thermal capability.
3. An analog electronic circuit with a time constant adjustable to the motor's thermal cooling time constant ensuring the memorization of the thermal state even after power supply disconnection or shorting out of the power semiconductors.

B. Provide phase loss, phase reversal, under-load, stall, and jam protection

2.6 CONTROLS

A. Provide control transformer within the enclosure to operate soft start control circuitry 120 Vac, 60 Hz.

B. Provide door-mounted operator devices.

C. Provide communication module to communicate with PLC.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install SSRVS in electrical enclosures or motor control centers as shown on the Drawings and in accordance with manufacturer's recommendations.

3.2 FIELD QUALITY CONTROL

A. Conduct field tests prior to energization per manufacturers recommendations.

B. Record and provide results of tests to Engineer.

3.3 START-UP AND TESTING

A. Provide programming, calibration and operational testing.

B. Set operating parameters as required.

3.4 DELIVERY

A. Reduced-voltage motor control equipment Provider shall deliver equipment to job site for installation by General Contractor. Coordinate delivery per General Contractor's construction schedule. Delivery shall include shipment to site and safe off-loading from delivery vehicle.

B. Reduced-voltage motor control equipment Provider shall provide an extended two year warranty covering defective parts on equipment to Owner at time of delivery.

END OF SECTION

OWNER PROVIDED REDUCED-VOLTAGE MOTOR CONTROLLERS
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SECTION 26 29 23.60

OWNER PROVIDED VARIABLE-FREQUENCY MOTOR CONTROLLERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Install Owner Provided Variable-Frequency Motor Controllers as specified herein, and as shown on drawings for a complete and functioning package, with installation of the electrical equipment by the Installation General Contractor. The Variable-frequency motor control equipment Provider will deliver equipment to site for installation by General Contractor, along with shop drawings, O&M Manuals and Two Year Warranty.
- B. Owner Provided Low-Voltage Circuit Protective Devices are shaded in the PRODUCTS section of this specification. **Shaded product information noted in this specification is for the General/Installation Contractor's information only.**

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
 - 1. Dimensions, nameplate data, electrical ratings and characteristics, wiring diagrams and manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals – Submit operation and maintenance manuals in compliance with pertinent provisions of Section 01 78 26, including the following:
 - 1. Harmonic distortion analysis which includes the following:
 - a. Calculations of percent voltage distortion with respect to the fundamental voltage on the line side bus.
 - b. Comparison of calculations with IEEE-519 standards for acceptable harmonic distortions.
 - 2. Documentation showing final configuration of each motor drive.
- C. Lubricants – None Required.
- D. Spare Parts – None Required.
- E. Provide factory operational test, heat test, and reports for motor loading at various speeds simulating field loading.

1.3 QUALITY ASSURANCE

- A. Comply with the following requirements:
 - 1. NFPA 70 (latest edition) - National Electrical Code (NEC).
 - 2. Local codes and ordinances.
 - 3. IEEE 519 (latest version).
 - 4. FCC 15J.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.
- B. Variable Frequency Equipment Provider shall deliver Variable-frequency motor control equipment to the project site complete and ready for installation within 10 weeks of execution of contract to purchase. This time includes all submittal and approval requirements.

1.5 WARRANTY

- A. Variable Frequency Motor Controller Equipment Provider shall provide two year warranty against defective equipment in compliance with pertinent provisions of Supplementary Conditions.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Design programmable microprocessor based, pulse width modulated (PWM) IGBT type variable frequency AC drives to provide adjustable speed control of 3-phase motors.
- B. Acceptable manufacturers:
 - 1. Allen-Bradley, PowerFlex 753.
 - 2. No substitution permitted.

2.2 VARIABLE FREQUENCY DRIVE (VFD)

- A. Provide two (2) VFDs as follows:
 - 1. Design for variable torque 75 horsepower motor application.
 - 2. Input power: 480 volt, 3 phase, 60 Hz.
 - a. Able to withstand voltage variations of +/-10 percent, and 3 percent maximum phase imbalance without affecting performance.
 - b. Displacement power factor to be 0.95 lagging, minimum.
 - c. Performance to be unaffected by line notching, transients, and harmonics on incoming line.
 - d. Minimum efficiency at rated load to be 97 percent.
 - 3. Output power: Capable of horsepower rating and service factor of motors furnished.
 - a. To include automatic function that will modify the volts/Hertz curve based on light load characteristics to minimize power consumption.
 - 4. Enclosure door mount and removable Human Interface Module (HIM) with keypad and LCD display to be used for all setup, operation, parameter adjustment, and monitoring.

5. Control Interface:
 - a. Provides means of interfacing discrete signals to drive.
 - b. Voltage Rating: 120VAC or 24VDC as required for application.
6. Communication module:
 - a. Compatible with Owner's communication protocol.
 - b. Able to accept four (4) additional discrete inputs.
7. Hand-Off-Auto selector switch.
 - a. Provide extra contact blocks for remote indication of selector switch position (Hand and Auto).
8. Pilot lights for drive status.
9. Input terminals for connection of motor winding heat sensor control wires and remote stop switch control wires.
 - a. Jumper on input terminals when heat sensors and/or user supplied stop pushbuttons.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

- A. Install motor drives in electrical enclosures or motor control centers as shown on the Drawings and in accordance with manufacturer's recommendations.
- B. Coordinate parameter settings with supplier of process control panels.

3.2 FIELD QUALITY CONTROL

- A. Conduct field tests prior to energization as follows:
 1. Megger check wire insulation levels (do not megger check solid state equipment).
 2. Record and provide results of tests to Engineer.

3.3 START-UP AND TESTING

- A. Provide programming, calibration, and operational testing.
- B. Set operating parameters as required.

3.4 DELIVERY

- A. Variable frequency motor control equipment Provider shall deliver equipment to job site for installation by General Contractor. Coordinate delivery per General Contractor's construction schedule. Delivery shall include shipment to site and safe off-loading from delivery vehicle.

END OF SECTION

SECTION 26 60 20
ELECTRICAL SERVICE

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide electrical service as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
 - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

1.3 QUALITY ASSURANCE

- A. Comply with the following requirements:
 - 1. NFPA 70 National Electrical Code (NEC).
 - 2. Local codes and ordinances.
 - 3. Utility Company providing service.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 ELECTRIC POWER SERVICE

- A. Electrical service for the site: 800 ampere, 480Y/277 volt, 3 phase, 4 wire, provided by Madison Gas and Electric Company (Utility Company).

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordinate upgrade of the existing electrical service to site with Utility Company and Owner/Engineer.

3.2 INSTALLATION

- A. The Utility Company will provide the following:
 - 1. Removal and replacement of existing service lateral wires running from Utility Company pad mounted transformer to lugs on Owner's main circuit breaker and neutral bus as shown on the Drawings.
- B. Provide the following and all other related electrical work and miscellaneous materials for a complete installation:
 - 1. Main circuit breaker as shown on the Drawings with lugs on the breaker and existing neutral bus listed for the number and AWG size of replacement service lateral wires.
 - 2. Verification of effective service grounding and main bonding jumper.
 - a. If existing service grounding and bonding is found to be deficient, then upgrade to comply with local code and utility company requirements.

3.3 OWNER RESPONSIBILITY

- A. Owner will pay directly to Utility Company all Utility installation and/or excess facilities charges, if any, and monthly service charges.

END OF SECTION

SECTION 31 23 39

EXCAVATING, BACKFILLING, AND COMPACTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Excavate, backfill, compact, and grade the site to the elevations shown on the Drawings, as specified herein, and as needed to meet the requirements of the construction shown in the Contract Documents.

1.2 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Use equipment adequate in size, capacity, and numbers to accomplish the work of this Section in a timely manner.
- C. Comply with requirements of governmental agencies having jurisdiction.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

PART 2 - PRODUCTS

2.1 FILL AND EXCAVATED BACKFILL MATERIALS

- A. Provide excavated backfill materials free from organic matter, rubble, or frozen material, containing no rocks or lumps over 6 inches, and with not more than 15 percent of the rocks or lumps larger than 2-3/8 inches.
- B. Fill material is subject to the approval of the Engineer, and is that material removed from excavations or imported from off-site borrow areas, predominantly granular, non-expansive soils free from organic matter and other foreign matter.
- C. Do not permit rocks having a dimension greater than 1-inch in the upper 12 inches of fill or embankment.

EXCAVATING, BACKFILLING, AND COMPACTING

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2.2 TOPSOIL

- A. Topsoil is specified under Section 32 92 00.13 of these Specifications.
- B. Obtain topsoil from sources within the project limits, or provide imported topsoil obtained from sources outside the project limits, or from both sources.

2.3 STRUCTURAL BACKFILL MATERIAL

- A. Provide well graded, 100 percent crushed gravel or crushed stone aggregate free of clay, loam, dirt, calcareous or other foreign matter, conforming to the Section 210 of the WDOT "Standard Specifications" with the following gradation:

<u>Sieve Size</u>	<u>Percent Passing</u>
3.0-inch	100%
No. 4	Not less than 25%
No. 200	Not more than 15%

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 GENERAL CONSTRUCTION REQUIREMENTS

- A. Protection of existing facilities, persons, and property:
 1. Unless shown to be removed, protect existing structures, conduits, active utility lines and all other facilities shown on the Drawings or otherwise made known to the Contractor. If damaged, repair or replace to a condition equal to or better than the original condition at no additional cost to the Owner.
 2. Notify all persons, firms, corporations, or agencies owning or using any existing structures, conduits, or utilities which may be affected by the Work prior to the start of construction.
 3. Make arrangements to locate, maintain, protect, and/or relocate facilities in order to complete the Work.
 4. If existing utilities are found to interfere with the permanent facilities being constructed under this Section, immediately notify the Engineer and secure his instructions.
 5. Do not proceed with permanent relocation of utilities until written instructions are received from the Engineer.

6. Barricade open holes and depressions occurring as part of the Work, and post warning lights on property adjacent to or with public access.
7. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
8. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.

B. Dewatering:

1. Remove all water, including rain water, encountered during trench and substructure work to an approved location by pumps, drains, and other approved methods.
2. Keep excavations and site construction area free from water.
 - a. Whenever during construction operations any loose material is deposited in the flow line of gutters, drainage structures, or ditches such that the natural flow line of water is obstructed, remove this loose material at the close of each working day. At the conclusion of construction operations, keep all drainage structures and flow lines free from dirt and debris.

C. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors, and to other work being performed on or near the site.

D. Maintain access to adjacent areas at all times.

3.3 EXCAVATING

A. Perform excavating of every type of material encountered within the limits of the Work to the lines, grades, and elevations indicated and specified herein.

B. Satisfactory excavated materials:

1. Transport to, and place in, fill or embankment areas within the limits of the Work.

C. Unsatisfactory excavated materials:

1. Excavate to a distance below grade as directed by the Engineer, and replace with satisfactory materials.
2. Include excavation of unsatisfactory materials, and replacement by satisfactory materials, as parts of the work of this Section.

D. Surplus materials:

1. Dispose of unsatisfactory excavated material, and surplus satisfactory excavated material, away from the site at disposal areas arranged and paid for by the Contractor.

- E. Topsoil materials:
 - 1. Strip and stockpile topsoil materials from areas to be excavated and regraded for use in final grading.

- F. Excavate and backfill in a manner and sequence that will provide proper drainage at all times.

- G. Borrow:
 - 1. Obtain material required for fill or embankment in excess of that produced within the grading limits of the Work from borrow areas selected and paid for by the Contractor and approved by the Engineer.

- H. Ditches and gutters:
 - 1. Cut accurately to the cross sections, grades, and elevations shown.
 - 2. Maintain excavations free from detrimental quantities of leaves, sticks, trash, and other debris until completion of the Work.
 - 3. Dispose of excavated materials as shown on the Drawings or directed by the Engineer; except do not, in any case, deposit materials less than 3'-0" from the edge of a ditch.

- I. Unauthorized excavation:
 - 1. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific instruction from the Engineer.
 - 2. Under footings, foundations, or retaining walls:
 - a. Fill unauthorized excavations by extending the indicated bottom elevation of the footing or base to the excavation bottom, without altering the required top elevation.
 - b. When acceptable to the Engineer, lean concrete fill may be used to bring the bottom elevation to proper position.
 - 3. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations, unless otherwise directed by the Engineer.

- J. Stability of excavations:
 - 1. Slope sides of excavations to 1:1 or flatter, unless otherwise directed by the Engineer.
 - 2. Shore and brace where sloping is not possible because of space restrictions or stability of the materials being excavated.
 - 3. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.

- K. Sheeting and bracing:
 - 1. Design, provide, and install sheeting and bracing as may be necessary for safety of personnel, protection of work, and compliance with requirements of governmental agencies having jurisdiction.
 - 2. Maintain sheeting and bracing in excavations regardless of the time period excavations will be open.

3. Remove sheeting and bracing after the excavation has been backfilled to an elevation which will prevent caving of exposed sidebanks.
 4. Fill voids left by the withdrawal of sheeting with compacted sand.
 5. Leave sheeting and bracing in place whenever necessary to protect adjacent facilities or property.
- L. Excavating for structures:
1. Conform to elevations and dimensions shown within a tolerance of 0.10 ft, and extending a sufficient distance from footings and foundations to permit placing and removing concrete formwork, installation of services, other construction required, and for inspection.
 2. In excavating for footings and foundations, take care not to disturb bottom of excavation:
 - a. Excavate by hand tools to final grade just before concrete is placed.
 - b. Trim bottoms to required lines and grades to leave solid base to receive concrete.
 3. Excavate for footings and foundations only after general site excavating, filling, and grading are complete.
 4. Minimum soil bearing capacity: 2500 psf or as otherwise required on the Drawings.
- M. Excavating for pavements:
1. Cut surface under pavements to comply with cross sections, elevations, and grades.
- N. Cold weather protection:
1. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.4 FILLING AND BACKFILLING

- A. General:
1. For each classification listed below, place acceptable soil material in layers to required subgrade elevations.
 2. In excavations:
 - a. Use satisfactory excavated backfill or borrow fill materials.
 3. Under concrete or bituminous pavements:
 - a. Use subbase materials as appropriate for conditions.
 4. Under slabs, footings, conduits and other structures and facilities:
 - a. Use structural backfill material.
- B. Backfill excavations as promptly as progress of the Work permits, but not until completion of the following:
1. Acceptance of construction below finish grade including, where applicable, dampproofing and water-proofing.

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2. Inspecting, testing, approving, and recording locations of underground utilities.
 3. Removing concrete formwork.
 4. Removing shoring and bracing, and backfilling of voids with satisfactory materials.
 5. Removing trash and debris.
 6. Placement of horizontal bracing on horizontally supported walls.
- C. Ground surface preparation:
1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious matter from ground surface prior to placement of fills.
 2. Plow, strip, or break up sloped surfaces steeper than one vertical to four horizontal so that fill material will bond with existing surface.
 3. When existing ground surface has a density less than that specified under "compacting" for the particular area, break up the ground surface, pulverize, moisture condition to the optimum moisture content, and compact to required depth and percentage of maximum density.
- D. Placing and compacting:
1. Place excavated backfill and fill materials in layers not more than 12 inches in loose depth.
 2. Place structural granular material in layers not more than 6 inches in loose depth.
 3. Compact each layer to the required density for the area.
 4. Do not place backfill or fill material on surfaces that are muddy, frozen, or containing frost or ice.
 5. Place backfill and fill materials evenly adjacent to structures, to required elevations.
 6. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around the structure to approximately the same elevation in each lift.
 7. Where the construction includes basement or other underground walls having structural floors over them, do not backfill such walls until the structural floors are in place and have attained sufficient strength to support the walls.
 8. Compact each layer of structural backfill material with vibratory rollers, pneumatic tampers, or other compacting equipment approved by the Engineer.

3.5 GRADING

- A. General:
1. Uniformly grade the areas within limits of grading under this Section, including adjacent transition areas.
 2. Smooth the finished surfaces within specified tolerance.
 3. Compact with uniform levels or slopes between points where elevations are shown on the Drawings, or between such points and existing grades.

- B. Grading around structures:
 1. Grade areas adjacent to structures to achieve drainage away from the structures, and to prevent ponding.
 2. Finish the surfaces to be free from irregular surface changes, and:
 - a. Shape the surface of areas scheduled to be under walks to line, grade, and cross-section, with finished surface not more than 0.10 ft above or below the required subgrade elevation.
 - b. Shape the surface of areas scheduled to be under pavement to line, grade, and cross-section, with finished surface not more than 0.05 ft above or below the required subgrade elevation.

3.6 COMPACTING REQUIREMENTS

- A. Control soil compaction during construction to provide the minimum percentage of density specified for each area as determined according to ASTM D1557 or AASHTO T-180.
- B. Provide not less than the following maximum density of soil material compacted at optimum moisture content for the actual density of each layer of soil material in place, and as approved by the Engineer.
 1. Structures:
 - a. Compact the top 8 inches of subgrade and each layer of fill material or backfill material at 95 percent of maximum density.
 2. Lawn and unpaved areas:
 - a. Compact the top 8 inches of subgrade and each layer of fill material or backfill material at 85 percent of maximum density.
 - b. Compact the upper 12 inches of filled areas, or natural soils exposed by excavating, at 85 percent of maximum density.
 3. Walks:
 - a. Compact the top 8 inches of subgrade and each layer of fill material or backfill material at 90 percent of maximum density.
 4. Pavements:
 - a. Compact the top 8 inches of subgrade and each layer of fill material or backfill material at 90 percent of maximum density.
- C. Moisture control:
 1. Where subgrade or layer of soil material must be moisture-conditioned before compacting, uniformly apply water to surface of subgrade or layer of soil material to prevent free water appearing on surface during or subsequent to compacting operations.
 2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compacting to the specified density.
 3. Soil material that has been removed because it is too wet to permit compacting may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing, or pulverizing.

3.7 MAINTENANCE

- A. Protection of newly graded areas:
 - 1. Protect newly graded areas from traffic and erosion, and keep free from trash and weeds.
 - 2. Repair and reestablish grades in settled, eroded, and rutted areas to the specified tolerances.
 - 3. Maintain until second mowing and acceptance by Owner.

- B. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape, and compact to the required density prior to further construction.

END OF SECTION

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TRENCHING, BACKFILLING, AND COMPACTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Trench, backfill, and compact as specified herein and as needed for installation of underground pipelines and utilities associated with the Work.
- B. References:
 - 1. The following detailed SPECIFICATIONS FOR TRENCHING, BACKFILLING, AND COMPACTING shall govern where they alter/or add to the requirements and specifications set forth in the STANDARD SPECIFICATIONS FOR SEWER AND WATER CONSTRUCTION IN WISCONSIN, latest edition and the WISCONSIN DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND STRUCTURE CONSTRUCTION, latest edition.

1.2 SUBMITTALS

- A. Shop Drawing Submittals – None Required.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.
- B. Use equipment adequate in size, capacity, and numbers to accomplish the work in a timely manner.
- C. Comply with requirements of governmental agencies having jurisdiction.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 GRANULAR PIPE BEDDING AND COVER MATERIALS

- A. Provide well graded, washed, mixture of 100 percent crushed gravel or crushed stone aggregate free of clay, loam, dirt, calcareous or other foreign matter conforming to the "Standard Specifications for Sewer and Water Construction in Wisconsin."

1. For pipe 18 inches in diameter and smaller, use material of 3/8-inch crushed stone chips with the following gradation:

Sieve Size	Percent Passing By Weight
1/2-inch	100%
3/8-inch	90-100%
No. 8	0-15%
No. 30	0-3%

2. For water mains with polyethylene wrap, use sand consisting of durable particles ranging in size from fine to coarse in a substantially uniform combination.

- a. Acceptable alternatives: Unwashed bank-run sand, rejected concrete sand, and crushed bank-run gravel.
 b. Include approximately 6 percent of fine clay or loam particles; do not allow clay or loam lumps.
 c. Moisture content: 10 percent maximum.
 d. Gradation requirements:

Sieve Size	Percent Passing By Weight
1-inch	100%
No. 16	45-80%
Material finer than No. 200	2-10%

3. For flexible thermoplastic pipes: Comply with ASTM D2321, Class I or II as modified below:

- a. Exclude sharp angular granular materials.
 b. Limit maximum particle size to 1/2-inch.
 c. Do not use Class II materials in wet conditions.

4. For rigid pipes comply with ASTM C12, Bedding Class B.

TRENCHING, BACKFILLING, AND COMPACTING

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2.2 EXCAVATED BACKFILL MATERIALS

- A. Provide soil materials free from organic matter, rubble, or frozen material, containing no rocks or lumps over 6 inches, and with not more than 15 percent of the rocks or lumps larger than 2-3/8 inches.

2.3 GRANULAR BACKFILL

- A. Provide either sand, pit run gravel, granular material, or excavated granular materials.

1. Sand: Well graded, free from organic matter, cohesionless, complying with the "Standard Specifications for Sewer and Water Construction in Wisconsin" with the following gradation:

Sieve Size	Percent Passing By Weight
1-inch	100%
No. 16	45-80%
Material finer than No. 200	2-10%

2. Pit run gravel: Free from organic matter, cohesionless granular material obtained from natural deposits of sand and gravel, passing 3/4-inch sieve, and not more than 15 percent passing the No. 200 sieve.

3. Granular material: Use granular materials consisting of durable particles ranging in size from fine to coarse in a substantially uniform combination complying with the "Standard Specifications for Sewer and Water Construction in Wisconsin" with the following gradation:

Sieve Size	Percent Passing By Weight
2-inch	95-100%
No. 4	35-60%
Finer than No. 200	5-15%

4. Excavated granular materials: A mixture of sand and gravel, free from organic matter, clay, loam, dirt, and other foreign material, passing the 1-1/2-inch sieve, with not more than 15 percent passing the No. 200 sieve.

5. No. 2 Crushed stone: Clean, hard, tough, durable, angular material crushed from bedrock limestone, dolomite, or granite.

- a. Gradation requirements:

Sieve Size	Percent Passing By Weight
3-inch	100%
2-1/2-inch	90-100%
2-inch	35-70%
1-1/2-inch	0-15%
3/4-inch	0-5%

2.4 AGGREGATE SLURRY BACKFILL

- A. Provide slurry backfill, thoroughly mixed in a concrete mixer truck complying with the "Standard Specifications for Sewer and Water Construction in Wisconsin".

2.5 LEAN CONCRETE MIX BACKFILL

- A. Provide lean concrete mix backfill, thoroughly mixed in a concrete mixer truck complying with the "Standard Specifications for Sewer and Water Construction in Wisconsin".

2.6 GROUT FOR FILLING OF ABANDONED PIPE

- A. Cellular grout:
 - 1. Low density cellular concrete capable of being mixed on site and pumped into place through a 2-inch hose.
 - 2. Foaming agent complying with ASTM C869.
 - 3. Portland Cement: ASTM C150, Type 1 or Type II.
 - 4. Contents: cement, fly ash, water and foaming agent.
 - 5. Minimum net density: 80 pcf.
 - 6. Acceptable manufacturers:
 - a. Meari Geofam Liquid Concentrate.
 - b. Geofill-Lite by "Mix On Site".
 - c. Or equal.

2.7 WATER MAIN REPAIR

- A. Repair water main or water services damaged during construction utilizing products of type and manufacturers as approved by the Owner.
- B. Pipe couplings for joining of sections of cut water main where a section of new pipe is used to replace a broken pipe.
 - 1. Acceptable manufacturers:
 - a. Dresser Style 38;
 - b. Smith-Blair CC-441;
 - c. Or equal.
- C. Repair clamps for broken or cracked pipe and sealing of existing corporation stop opening:
 - 1. Use full-circle single band all stainless steel clamps.
 - 2. Acceptable Manufacturers:
 - a. Dresser Style 360;
 - b. Smith-Blair 200 Series;
 - c. Or equal.
 - 3. Replace damaged service corporation stops by installation of full-circle single band all stainless steel clamps, with service outlet, matching manufacturer's and styles used for repair of a cracked pipe.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 GENERAL CONSTRUCTION REQUIREMENTS

- A. Protection of existing facilities:
1. Unless shown to be removed, protect existing structures, conduits, active utility lines and all other facilities shown on the Drawings or otherwise made known to the Contractor. If damaged, repair, replace, or restore to a condition equal to or better than the original condition at no additional cost to the Owner.
 2. Notify all persons, firms, corporations, or agencies owning or using any existing structures, conduits, or utilities which may be affected by the Work prior to the start of construction.
 3. Make arrangements to locate, maintain, protect, and/or relocate facilities in order to complete the Work.
 4. Make such exploration as is necessary to determine the exact location of underground utilities.
 5. Exercise care during the progress of work in the area to prevent damage to the utilities.
 6. Whenever it becomes necessary to relocate underground gas mains, telephone conduit, or electrical lines, the utility company involved will make such relocation. Notify the utility company promptly.
 7. Whenever it becomes necessary to relocate water or other pipes or conduits in direct conflict with the proposed pipe (exclusive of culverts) which are not shown on the Drawings, obtain the direction from the Engineer for the relocation. Compensation will be allowed only for such quantities as directed by the Engineer.
 8. Do not block or obstruct sidewalks, streets, and pavements.
 9. Whenever during construction operations any loose material is deposited in the flow line of gutters, drainage structures, or ditches such that the natural flow line of water is obstructed, remove this loose material at the close of each working day. At the conclusion of construction operations, keep all drainage structures and flow lines free from dirt and debris.
 10. Do not obstruct accessibility of fire hydrants.
 11. Maintain access to adjacent areas at all times.
- B. Protection of Trees and Shrubs:
1. Protect trees and shrubs from damage.
 2. Provide exhaust deflectors or other devices for machinery as required to prevent damage to trees and shrubs from exhaust gases.
 3. Do not remove trees or shrubs unless indicated on the Drawings or authorized in the field by the Engineer.
 4. Where trees which are to remain interfere with normal excavation operations, use the following procedures:

- a. Prior to excavation, carefully remove trees with trunk diameters of less than 4 inches, shrubs, and other plantings in the way of construction.
 - b. Do not machine excavate within a distance of three trunk diameters or 12 inches (whichever is greater) of any tree, and do not cut roots over 2-inch diameter unless approved by the Engineer.
 - c. Excavate by hand when closer than three tree trunk diameters or 12 inches (whichever is greater).
 - d. Tree tunneling where necessary to be determined by the Engineer.
 - e. Tie back shrubs and tree limbs to prevent loss or damage.
 - f. Prune and seal damaged limbs and branches.
 - g. Provide plank wrappers wired in place to protect tree trunks from being damaged by trench machinery, tractors, or trucks; remove protective planking as soon as practical after work in vicinity has been completed.
 - h. Remove spoil banks from around trees by hand to prevent damage to trunks by construction machinery.
5. Replace trees and shrubs which cannot be protected or are damaged during construction:
- a. Replant or replace with stock of like character, quality, variety, size, shape, color and condition upon completion of the construction.
 - b. Replace 4-inch diameter and larger trees with one 4-inch diameter size tree for each 6-inches of original tree diameter or fraction thereof.
 - c. Replace trees smaller than 4-inch diameter and shrubs with same kind and type.
 - d. As an option, replant trees smaller than 2-inch diameter or shrubs which are not damaged.
6. Remove and replace trees and shrubs which do not survive in good condition for a period of 18 months after time of planting.
- C. Work on private property:
1. Construct work on private property within easements obtained by the Owner as shown on the Drawings.
 - a. The Contractor will be permitted construction privileges within construction easement lines as shown on the Drawings.
 - b. Perform the work in a manner such as to minimize damage to lawns, shrubs, trees and other plantings, driveways, sidewalks, fences, outbuildings, and any other miscellaneous improvements, using proper size and type of equipment.
 - c. The Engineer has the authority to prohibit the use of any equipment which in his judgment is too large or otherwise unsuitable for the conditions of the work on private property.
 2. Remove and replace fences, outbuildings and other miscellaneous improvements in the way of construction to the satisfaction of the property owner.
 3. When working in cultivated fields or gardens, remove original topsoil to a depth of 12 inches prior to excavation, and replace the topsoil to its original depth and grade upon completion of trench backfill.
 4. Restore the private property to its original condition or better, free of debris, stones and excess materials.

3.3 TRENCHING

- A. Do not advance trench excavation more than 50 feet ahead of completed pipe installation except as approved by the Engineer.
- B. Provide and maintain sheeting, shoring, and bracing necessary for protection of the Work, adjacent property, and for the safety of personnel.
 - 1. Remove temporary sheeting and bracing after backfilling to an elevation which will prohibit caving of exposed sidebanks.
 - 2. Fill voids left by the withdrawal of sheeting with compacted sand.
 - 3. The Engineer may direct that supports in trenches be cut off at any specific elevation to protect adjacent facilities or property. Compensation for support left in place will be negotiated.
 - 4. No extra payment will be made for the supports left in place without the direction of the Engineer.
 - 5. Do not leave supports within 4 feet of the ground or pavement surface in place without the permission of the Engineer.
- C. Provide pumping, bailing, wellpointing, and construct ditches and dikes required to dewater and drain ground water, sewage, or storm water to keep the excavation and site dry for the completion of the Work.
- D. Excavation:
 - 1. Excavate by open cut unless otherwise indicated on the Drawings.
 - 2. Excavate trenches to the depths and grades necessary for the pipelines with allowances for bedding material.
 - a. Comply with the following minimum depth of cover unless otherwise noted on the Drawings:
 - Water pipelines: 6 feet.
 - Sewage and sludge pressure piping: 5 feet.
 - Air and gas piping: 3 feet.
 - Electrical or wiring conduits and cables: 30 inches.
 - 3. Overexcavate organic, soft, spongy, or otherwise unsuitable soils found at or below the bottom of the trench to meet firm subsoil or as directed by the Engineer.
 - 4. Comply with the following maximum trench widths at the top of pipelines:

<u>Nominal Pipe Sizes (Inches)</u>	<u>Trench Widths (Inches)</u>
12 or smaller	30
14-18	36
20-24	42
27-30	48
33 and larger	1-1/3 times pipe O.D.

- 5. Where the trench width exceeds the maximum limitations, provide higher strength pipe, or embed or cradle the pipe in concrete to achieve the necessary load factor as determined by the Engineer at no additional cost to the Owner.

3.4 EXCAVATION FOR APPURTENANCES

- A. Excavate for manholes and similar structures to the depths as shown on the Drawings and to a distance sufficient to leave at least 12 inches clear between outer surfaces and the embankment or shoring that may be used to hold and protect the banks.
- B. Overdepth excavation beyond depths indicated on the Drawings that has not been directed will be considered unauthorized. Fill with sand, gravel, or lean concrete as directed by the Engineer, and at no additional cost to the Owner.

3.5 BEDDING AND COVERING OF PIPE

- A. General:
 - 1. Bedding is defined as the shaped and tamped material which supports the pipes. Covering is defined as the compacted material which protects and covers the pipes.
 - 2. Provide continuous bedding and covering for underground pipelines, except where concrete encasement, concrete cradles, boring or jacking are indicated.
- B. Pipe bedding:
 - 1. Provide compacted granular pipe bedding and covering material with a minimum thickness of 4 inches under pipe barrels and 2 inches under bells.
 - 2. Wherever the trench is overexcavated due to the removal of unsuitable material, refill the excavated area to the bottom of the pipe bedding with No. 2 crushed stone or granular material conforming to the Granular Backfill Materials gradation.
 - a. Removal and replacement of material, or unsuitable material, to a depth of one foot below the bottom of the pipe barrel is considered incidental to installation of the pipe.
 - 3. Wherever the trench is overexcavated to remove unsuitable material, install geotechnical fabric between native soil and granular material:
 - a. Install fabric to cover bottom and sides of trench to heights as follows:
 - (1) Sanitary sewer, force main, and water main: to envelope entire bedding and covering material and overlap 1 foot at the top.
 - (2) Storm sewer: to cover bedding material and from sides of trench to edge of pipe.
 - (3) Where undercut is of a depth that requires more than one piece of fabric to provide envelope, provide sewn seams between sections of fabric.
 - 4. Wherever two or more pipes or conduits are placed in the same trench or excavated area, backfill the trench with granular pipe bedding and covering material to support the uppermost pipe or conduit.
 - 5. Provide sand bedding with a minimum thickness of 3 inches under electrical and wiring conduits and cables.
- C. Pipe covering:

1. Following placement of pipe and inspection of joints, provide compacted granular pipe bedding and covering material for the full width of the trench to the following levels unless otherwise shown on the Drawings:
 - a. For pipes sizes 24-inch and smaller, except flexible thermoplastic pipe: To 4 inches above the top of the pipe.
 - b. For pipes sizes 27-inch and larger, except flexible thermoplastic pipe: To the horizontal centerline of the pipe.
 - c. For flexible thermoplastic pipes: To 12 inches above the top of the pipe.
 - d. If compacted excavated materials are used for backfilling under the pavement as indicated on the Drawings: To 12 inches above the top of the pipe for all pipe sizes.
2. Place granular pipe bedding and covering material in uniform loose layers not exceeding 8 inches thick.
 - a. Compact each layer firmly by ramming or tamping with tools approved by the Engineer in such a manner as not to disturb or injure the pipe to yield a minimum density of 95 percent of maximum dry density as determined according to ASTM D1557 or AASHTO-T180.
3. Where trench is widened by installation of structures or jacking pits, extend bedding and covering materials to total width of excavation.

3.6 TRENCH BACKFILLING AND COMPACTING

- A. General:
 1. Backfill trench from the top of pipe cover to topsoil, paving subgrade, or foundation level.
 2. If trenches settle during the period of construction and within the guarantee period of the work, fill trench back to the surrounding grade, and restore the surfaces.
- B. For trench in lawns, parkways, and other improved areas not subject to vehicular traffic:
 1. Backfill with excavated materials in uniform loose layer not exceeding 12 inches thick.
 2. Compact each layer of trench backfill materials to yield a minimum of 85 percent of maximum dry density as determined according to ASTM D1557 or AASHTO-T180.

- C. For trench in unimproved areas and cultivated fields:
 - 1. Backfill with excavated materials.
 - 2. Provide crowned surface to compensate for settlement.

 - D. For trench in streets, parking areas, driveways, sidewalks, curb and gutter, or within 2 feet of any proposed curb and gutter, sidewalk, and other paved areas:
 - 1. Backfilling with granular backfill materials:
 - a. Place in uniform loose layer not exceeding 12 inches thick and compact with vibrating roller or equivalent.
 - b. Fill the top of trenches with temporary aggregate pavement material to the depth(s) required to provide aggregate base and pavement base, binder and surface courses of the depth(s) shown in the Details in the Drawings.
 - 2. Compacting requirements:
 - a. Compact each layer of trench backfill materials to yield a minimum density of 90 percent of maximum dry density as determined according to ASTM D1557 or AASHTO T-180.
 - b. Determine the density of compacted backfill at intervals of not more than 500 feet at locations selected by the Engineer.
 - c. The Owner will provide the services of an independent testing laboratory for the density tests complying with the pertinent provisions of Section 01 45 29.
 - 3. Maintain temporary aggregate pavement level with adjoining pavement surfaces until the permanent pavement is placed.
- 3.7 BACKFILL AND BEDDING FOR APPURTENANCES
- A. Provide 3 inches of sand or granular bedding material unless otherwise shown on the Drawings.
 - B. Do not backfill until new concrete has properly cured, and any required tests have been accepted.
 - C. Backfill in lawns and landscaped areas with excavated materials.
 - D. Backfill in pavement around manholes, catch basins, inlets, valve vaults, and other structures as directed by the Engineer with granular backfill materials.

3.8 FINISH GRADING

- A. General:
 - 1. Provide finish grading and filling to achieve the lines and grades.
 - 2. Slope grades to drain away from structures.

- B. Finish grading:
1. Except where mounding over trenches is specified, grade smooth areas of the Work including previously grassed areas that have been disturbed, and adjacent transition areas.
 2. Fill and compact depressions from settlement and round tops of embankments and breaks in grade.
 3. Protect newly graded areas from traffic and erosion. Repair settlement or washing away that may occur prior to surface restoration and re-establish grades to the required elevations at no additional cost to the Owner.
- C. Disposal of waste excavated material:
1. Remove unsuitable and surplus excavated materials not used for backfilling from the project site.
 2. Do not deposit on public or private property without written permission from property owner or authorized representative of appropriate public agency.

3.9 ROCK EXCAVATION

- A. No Rock Excavation is expected. Rock excavation, if encountered, is classified as excavation requiring blasting or jack hammering to remove solid rock formations such as boulders, concrete, or solid masonry exceeding one cubic yard in volume and will be handled on a time and material basis for removal if encountered.
- B. Allowable trench width for open trench excavation:
1. For pipes up to 18 inches ID: 30 inches.
 2. For larger pipes: The outside diameter of the pipe plus 8 inches.
 3. Pipe bedding: 6 inches below the bottom of the pipe.
 4. Manholes and similar structures not requiring formwork: 1-foot outside such structures.
- C. Lay pipelines constructed in trenches in rock to the grades shown on the Drawings on a continuous bed of compacted gravel or crushed stone.
1. Dispose of excavated rock; do not use as backfill.
- D. Blasting:
1. Comply with rules and regulations of authorities having jurisdiction.
 - a. Issue signals of danger before firing a blast.
 - b. Do not blast adjacent to any portion of the completed work unless proper precautions are taken to protect the work.
 - c. Use only persons who are licensed as required by State or local regulations, and who are experienced in the techniques of blasting, to perform blasting operations.
 2. Repair or reconstruct structures, pipelines, or other property damaged by blasting operations.

3.10 WATER MAIN REPAIR

- A. Whenever existing water mains and water service pipes are damaged during construction, stop the pipe installation work and immediately repair the damaged portion of the existing piping.
- B. Contact the Engineer and Owner immediately to report the location and extent of the damage.
- C. Repair the water main with methods of complying with "Standards for Water and Sewer Main Construction in Wisconsin", and any additional requirements required by the Owner.
- D. Utilize only materials of repair as noted in the products section of this specification or as dictated by the Owner.
- E. Where water services have been stripped or pulled from the water main, replace the corporation stop as instructed by the Engineer and Owner, and replace the water service pipe to a point as directed by the Owner.
- F. Comply with disinfection requirements as dictated by the Owner.
- G. Do not cover the repair until work is inspected and approved by the Owner.

END OF SECTION

SECTION 31 25 00

EROSION AND SEDIMENTATION CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide erosion and sedimentation controls as shown on the Drawings, as specified herein, as required by the governmental authority, and as needed for a complete and proper installation.
- B. Related documents:
 - 1. "Wisconsin Department of Natural Resources Storm Water Management Technical Standards" and "Conservation Practice Standards".
 - 2. WDOT "Standard Specifications" and "Erosion Control Product Acceptability List".
 - 3. City of Madison Standard Specifications for Public Works Construction Erosion Control Standards (attached to back of this specification).

1.2 QUALITY ASSURANCE

- A. Provide 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 methods needed for proper performance of the work of this Section.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide erosion and sedimentation controls in accordance with the requirements of the Wisconsin Department of Natural Resources and the Wisconsin Department of Transportation (WDOT) "Standard Specifications" and City of Madison Standard Specifications for Public Works Construction Erosion Control Standards.
- B. Provide manufacturer's certification that fabric meets the minimum specified value, if requested by the Engineer.

EROSION AND SEDIMENTATION CONTROLS

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2.2 TEMPORARY EROSION AND SEDIMENT CONTROL SYSTEMS

- A. Straw bale barrier:
1. Material: Clean, weed-free straw, or similar material, from agricultural crops.
 2. Bales: Compacted, tightly bound with twine only, not wire.
 3. Bale stakes: 1/2-inch diameter steel, or 1-inch diameter wood.
 - a. Length: 4 feet minimum.
- B. Silt fence:
1. Material: Geotechnical fabric of woven or non-woven filaments of polypropylene, polyester, or polyethylene.
 - a. Non-woven fabric: Needle-punched, heat-bonded, resin-bonded, or a combination thereof.
 - b. Filaments: Dimensionally stable, resistant to delamination, free from chemical treatments or coatings that reduce porosity and permeability, and resistant to ultraviolet radiation.
 - c. Properties:
 - (1) Width: 3.5 feet minimum.
 - (2) Weight: 4.0 ounces per square yard minimum, ASTM D-3776-96 (2002).
 - (3) Grab tensile strength: 200 pounds minimum, ASTM D-4632.
 - (4) Grab elongation @ failure: 15 percent minimum, ASTM D-4632.
 - (5) Burst strength: 250 psi minimum, ASTM D-751.
 - (6) Equivalent opening size (EOS) US Standard sieve number: non-woven - 30 minimum, woven - 50 minimum.
 - d. Acceptable products:
 - (1) Mirafi 100X, Mirafi, Inc., Charlotte, North Carolina
 - (2) Supac 5WS, Phillips Fibers Corp., Greenville, South Carolina
 - (3) Or equal.
 2. Support posts:
 - a. Type:
 - (1) Treated wood: 2-inch by 4-inch, or 3.0 square inch cross section.
 - (2) Steel: Standard "T" or "U" sections weighing not less than 1.00 pound per linear foot.
 - b. Length: 4-1/2 feet minimum.
 - c. Interval: 5 feet (typical).
 - d. Use existing fence posts where available, if approved by Engineer.
 3. Use metal staples, nails, or wire to fasten fabric to posts.
- C. Temporary cover:

1. Comply with Section 32 92 00.13 of these Specifications for purity and germination.
2. Seed: Annual rye, spring oats, or wheat.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Install erosion and sedimentation controls prior to any other construction and maintain until site is stabilized.
- B. Prepare subgrade for the installation of the erosion and sedimentation control systems to the lines and grades shown on the Drawings.
Repair eroded or washed out areas prior to the installation of erosion and sedimentation control systems.

3.2 STRAW BALE BARRIER

- A. Install straw bale barriers where shown on the Drawings and as directed by the Engineer.
 1. Place bales at the toe of the slope or on the contour in a row with ends tightly abutting the adjacent ends.
 2. Embed each bale 4 inches, minimum.
 3. Place bales such that bindings are horizontal.
 4. Anchor each bale by driving two (2) stakes through the bale.
 - a. Drive the first stake in each bale towards the previously laid bale at an angle to force the bales together.
 - b. Drive stakes flush with the bale.
 5. Inspect bales frequently and repair or replace as necessary.
 6. Remove bales upon completion of Work or as directed by Engineer.

3.3 SILT FENCE

- A. Install silt fence where shown on the Drawings, and as directed by the Engineer.
 1. Perform maintenance as needed.
 2. Remove material when it reaches 1/3 of the fence height, and as directed by Engineer.
 3. Replace fence where it is torn or otherwise damaged.
 4. Retrench or replace fence that is not properly entrenched or anchored.
 5. Remove fence upon completion of Work, or as directed by Engineer.

3.4 TEMPORARY COVER

- A. Install temporary cover where shown on the Drawings, in accordance with pertinent provisions of Section 32 92 00.13 of these Specifications, particularly Article 32 92 00.13 3.4, and as directed by the Engineer.

END OF SECTION

SECTION 32 92 00.13

LAWNS AND GRASSES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide topsoil, seeding, sodding, and care of grass during establishment period for a complete surface restoration of lawns, parkways, and other areas disturbed as a result of the construction.
- B. Construct the work of this section in accordance with WDOT "Standard Specifications" except as herein modified.

PART 2 - PRODUCTS

2.1 TOPSOIL

- A. Comply with the requirements of Section 625 of the WDOT "Standard Specifications" for materials and material preparation.

2.2 FERTILIZER

- A. Comply with the requirements of Section 629 of the WDOT "Standard Specifications" for materials and material preparation.

2.3 MULCH

- A. Vegetative mulch:
 - 1. Provide vegetative mulch for seeded areas of a high-quality, air-dried straw of wheat, rye, oats, beans, or other approved straw, free from grass, broom sedge, noxious weeds, and weed seeds detrimental to growth of grass.
- B. Hydraulic mulch:
 - 1. Provide virgin wood cellulose fibers complying with the following properties (percent by weight):
 - 2. Moisture content 15
 - 3. Organic matter, minimum 95
 - 4. Water holding capacity 400
 - 5. pH 4.3-8.5

2.4 SEED

- A. Provide new crop seed furnished in standard sealed containers bearing seed tags showing purity, germination, and weed seed content, free of wild onion, Canadian thistle, crab grass, and seeds of other noxious weeds, complying with the requirements of Section 630 of the WDOT "Standard Specifications".
 - 1. Use Seed Mixture No. 10 where average loam, heavy clay or moist soils predominate.
 - 2. Use Seed Mixture No. 20 where light, dry, well-drained, sandy or gravelly soils predominate.
 - 3. Use Seed Mixture No. 30 on medians and on slopes or ditches within 15 feet of the shoulder where salt tolerant turf is desired.
 - 4. Use Seed Mixture No. 40 where a lawn type turf is desired.

2.5 SOD

- A. Provide field or nursery grown sod that is native to the locality of the Project.
- B. Provide sod that will not break, crumble or tear during handling and placing, free of stones, crab grass, noxious weeds, and other objectionable plants or substances injurious to plant growth.
- C. Provide sod having at least 1-inch of soil adhering firmly to the roots and cut in rectangular pieces with the shortest side not less than 12 inches. At the time of cutting sod, mow the grass height not less than 2 inches nor more than 4 inches.
- D. Do not use sod cut for more than 48 hours.

PART 3 - EXECUTION

3.1 TOPSOIL PLACEMENT

- A. Scarify the compacted subgrade to a depth of 3 inches to receive the topsoil.
- B. Spread at least 4 inches of prepared topsoil in areas of new grading raked smooth and level.
- C. Grade flush with walks, curbs, and paving.

3.2 PREPARATION FOR SODDING OR SEEDING

- A. Do not start preparation until all other site and utility work and finished grading within the areas to be seeded have been completed.

- B. Till topsoil to a depth of at least 3 inches and smooth out all surface irregularities resulting therefrom. Leave area free of rocks or hard soil clods which will not pass through the tines of a standard garden rake.
- C. At least 7 days before applying fertilizer, spread lime uniformly in sufficient quantity to produce in the soil a pH of 6.5. Work lime thoroughly into topsoil to a depth of 3 inches.
- D. Apply fertilizer in accordance with the WDOT "Standard Specifications".

3.3 SODDING

- A. Provide sod in developed areas that were grassed prior to construction and as indicated on the Drawings. Sodding shall also be used in ditches and drainage swales and on all embankment slopes steeper than 3 to 1 unless protection is provided against erosion of seeding. At the Contractor's option, sodding may be substituted for seeding, but at no additional cost.
- B. Place sod with the edges in close contact and alternate courses staggered. Lightly tamp or roll to eliminate air pockets. On slopes 2 to 1 or steeper, stake sod with not less than 4 stakes per square yard and with at least one stake for each piece of sod. Stakes shall be driven with the flat side parallel to the slope. Do not place sod when the ground surface is frozen or when air temperature may exceed 90 degrees F. Water the sod thoroughly within 8 hours after placement and as often as necessary to become well established.
- C. In ditches, the sod shall be placed with the longer dimension perpendicular to the flow of water in the ditch. On slopes, starting at the bottom of the slope, the sod shall be placed with the longer dimension parallel to the contours of the ground.
- D. All exposed edges of sod shall be buried flush with the adjacent turf.

3.4 SEEDING

- A. Seed all grassed areas disturbed by construction operations and not receiving sod, and as indicated on the Drawings.
- B. Sow seed between September 1 and November 1, or in spring from time ground can be worked until May 15.
- C. Apply seed during favorable climatic conditions. Do not seed in windy weather or when soil is very wet. Sow seed at the rate specified for each seed mixture.
- D. Broadcasting seeding method:
 - 1. Sow seed with mechanical seeder in two directions at right angles to each other to achieve an even distribution of seed.

2. After seeding, rake seed lightly into ground and roll with a roller weighing between 100 and 200 pounds per foot of roller width.

E. Hydraulic seeding method:

1. When seed is applied with a hydraulic seeder, apply at a rate of not less than 1,000 gallons of slurry per acre containing the proper quantity of seed specified above.
2. When using a hydraulic seeder, apply the fertilizer in a separate operation.

3.5 MULCHING SEEDED AREAS

- A. Immediately after rolling seeded areas, apply mulch at the rate of 2 tons per acre within 24 hours after seeding. Use vegetative mulch on all seeded areas unless hydraulic seeding method is used.

- B. Apply mulch in accordance with the WDOT "Standard Specifications".

3.6 WATERING

- A. Immediately after placing erosion control matting or mulch, water seeded areas thoroughly with a fine mist spray. Keep soil thoroughly moist until seeds have sprouted and achieved a growth of 1-inch. For sod, immediately begin watering and continually keep moist until the sod has firmly knit itself to the topsoil.

3.7 PROTECTION OF WORK

- A. Protect newly seeded and sodded areas from all traffic by erecting temporary fences and signs. Protect slopes from erosion. Properly and promptly repair all damaged work when required.

3.8 APPLICATION OF FERTILIZER

- A. Six weeks after completion of seeding or sodding apply granular fertilizer over all areas at the rate of 2 lbs. of nitrogen nutrients per 1,000 sq.ft. of area.

3.9 CLEAN-UP

- A. At the time of final inspection of work, but before final acceptance, remove from seeded and sodded areas all debris, rubbish, excess materials, tools, and equipment.

3.10 MAINTENANCE

- A. Provide watering, mowing, and replanting and continue as necessary until a close healthy stand of specified grasses is established which is defined as when a second mowing is necessary and accepted by Owner.

- B. Replace lawns not showing a close uniform stand of healthy specified grasses at the end of the guaranty period and maintain until acceptance.

END OF SECTION

SECTION 33 21 71

WELL PUMP MOTOR EQUIPMENT INSTALLATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Install and electrically connect new vertical motor for existing well pump as specified herein and as needed for a complete and functioning unit.
- B. New vertical motor noted as shaded in the PRODUCTS section of this specification will be provided by Others. The Provider of the new well pump motor will deliver the motor and any required modifications to allow the new motor to be directly connected to the existing deep well discharge head, confirm installation prior to start-up, and observe field testing after installation. **Shaded product information noted in this specification is for the Installation Contractor information only.**

1.2 EXISTING EQUIPMENT

- A. Well No. 20:
 - 1. Pump Discharge Head: Goulds 12 inch, with a motor mating flange of 24.5 inches in diameter and four bolt holes inset 5 inches towards shaft.
 - 2. Motor: GE Vertical 300 HP, B WP1, 480 Volt, 1765 rpm, 326 amps, Serial # ZT671359A, Type KS, Code G, L449TP24 frame.
 - 3. Well Pump; Five stage American Turbine, 15-M-200, rated at 2,200 gpm at 450 feet of head.

1.3 START UP SERVICES

- A. Comply with pertinent provisions of Section 01 91 58 regarding acceptance of installation and field start-up.

PART 2 - PRODUCTS

2.1 VERTICAL HOLLOWSHAFT MOTOR

- A. Products noted as shaded in this section will be provided by Owner, but installed by Installation Contractor.
- B. Provide a 350 Hp premium efficient, vertical hollow shaft squirrel cage induction type motor for continuous operation with inverter grade insulation system, suitable for use on a VFD and meeting NEMA MG-1, Part 31, operating on 480 volts, 3 phase, 60 Hertz alternating current with:
 - 1. Shielded drip-proof design.

2. Thrust bearings of ample capacity to carry the full weight of all rotating parts plus the total maximum hydraulic thrust.
3. Non-overloading throughout the capacity-head curve without the inclusion of the service factor.
4. Service factor of 1.15.
5. Motor with manufacturer's prime and final coatings with no field painting required.
6. Verification by supplier that bolt diameter (BD) of existing discharge head will allow new motor BD to match existing discharge head or provide modifications as required in accordance with manufacturer's recommendations to allow new motor to readily bolt to the existing discharge head.

C. Acceptable Base Bid Motor manufacturers:

1. US Motors.
2. GE.
3. Baldor.
4. Marathon Electric.
5. Or equal (with prior Owner Approval).

D. Alternate pump manufacturers/providers must meet the following criteria:

1. Pre-approved by Owner as allowed in Bidding Documents.
2. Nominal 1,800 rpm speed, only.
3. Proof of equal materials of construction, quality, durability, appearance, strength and design characteristics.
4. Nationally recognized manufacturer with satisfactory installation and performance record within US and Wisconsin.
5. Local and responsive service within 100 miles of installation.

PART 3 - EXECUTION

3.1 WELL PUMP MOTOR PROVIDER

- A. Well Pump Motor Provider shall deliver well pump motor to job site for installation by General Contractor. Coordinate delivery per General Contractor's construction schedule. Delivery shall include shipment to site and safe off-loading from delivery vehicle.
- B. Well Pump Motor Provider shall provide General Contractor (and General Contractor's designated mechanical and/or electrical subcontractors) with manufacturer's recommendations for proper installation.
- C. Well Pump Motor Provider shall provide inspection of final installation and prepare an installation report prior to final field testing and acceptance of well pump motor by Owner.

WELL PUMP MOTOR INSTALLATION

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- D. Well Pump Motor Provider shall provide an extended 2-year warranty covering defective parts on booster pumping equipment to Owner at time of delivery.

3.2 WELL PUMP MOTOR INSTALLATION

- A. Install well pump motor and bolt on to existing motor mounting flange with suitable bolts.
- B. Provide necessary motor/pump shaft coupling and final alignment.
- C. Install equipment in accordance with manufacturer's recommendations.
- D. Attach existing vibration sensor and electrical connections for completed and functioning unit.

3.3 FIELD QUALITY CONTROL

- A. Provide the services of a qualified representative to supervise the installation and testing of the pump equipment and submit a testing startup report.

END OF SECTION

SECTION 40 91 23.33

FLOW PROCESS MEASUREMENT DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide flow process measurement devices as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
 - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
 - 1. Manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals: Submit operation and maintenance manuals in compliance with pertinent provisions of Section 01 78 26.
- C. Certificates and Guarantees – None Required.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

1.3 QUALITY ASSURANCE

- A. All flow process measurement device of the same type to be provided by one manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 ELECTROMAGNETIC FLOW METERS

- A. Provide electromagnetic, micro processor-based flow meters and detector with a remote mounted converter meeting the following requirements:
1. Transmitter:
 - a. Power supply: 24 VDC or 120 VAC as shown on the Drawings.
 - b. Output: Isolated 4-20 mA_{dc} and pulse configurable for set volume per pulse.
 - c. Display: Alphanumeric LCD displaying flow rate and totalized flow.
 - d. Adjustment: Field programmable by keypad entry.
 - e. Operating temperature: -4 to 120 degrees F.
 - f. Enclosure: NEMA 4X.
 - g. Mounting: Remotely mounted as shown on the Drawings.
 - h. Utilizes high impedance circuitry.
 2. Transducer:
 - a. Design: Permanent submergence Pulsed DC Magnetic type, measures bi-directional flow, and automatic adjustment of sensitivity to match flow velocities.
 - b. Submersible cable(s) factory-sealed at the transducer and routed continuously without splices to transmitter for remote-mounted transmitters.
 - c. Flow range: 1 fps to 30 fps.
 - d. Ambient temperature: -4 to 120 degrees F.
 - e. Tube: Min. carbon steel, 150# ANSI steel flanges end connections.
 - f. Liner: Per manufacturer's recommendations for application.
 - g. Electrodes: 316 stainless steel.
 - (1) Provide removable or electrode cleaning system in applications where electrodes may be coated and require periodic cleaning.
 - h. Submergence protection: NEMA6P or IP68.
 - i. Sealed, welded housing with separate electrode compartment
 3. Provide the following accessories:
 - a. NEMA 4X Instrument Enclosure in compliance with Section 40 95 15 for transmitter mounting when mounted outside as shown on the Drawings.
 - b. AC power lines noise filter and voltage surge protector as required.
 - c. Two (2) 316 stainless steel lining protectors or grounding rings, or grounding electrode.
 - d. Cleaning unit as required if non-removable electrodes are provided.
 4. Acceptable manufacturers:
 - a. Toshiba LF654 with LF622F.
 - b. No substitutions.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install flow process measurement devices in accordance with manufacturer's recommendations.
- B. Remote readout shall be installed on an angled bracket bolted to floor adjacent to pipe and flow meter. Location to be approved in field.

3.2 CALIBRATION

- A. Calibrate and program equipment to meet system requirements and within 1% of actual field testing.

3.3 START-UP AND TESTING

- A. Test accuracy in field with new orifice pipe at least 6 feet long and of suitable size to provide at least 48 inches of back pressure or alternative and approved field testing device. Connect orifice pipe or test equipment to hose from fire hydrant and discharge in street.
- B. Comply with other pertinent manufacturer's testing procedures.

END OF SECTION

SECTION 40 95 92

RELAYS

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide relays as shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. References:
 - 1. Reserved.

1.2 SUBMITTALS

- A. Shop Drawing Submittals:
 - 1. Manufacturer's detailed specifications.
- B. Operation and Maintenance Manuals – None Required.
- C. Certificates and Guarantees: None Required beyond General Warranty.
- D. Lubricants – None Required.
- E. Spare Parts – None Required.

1.3 QUALITY ASSURANCE – Reserved.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.

1.5 SITE CONDITIONS – Reserved.

1.6 MAINTENANCE – Reserved.

PART 2 - PRODUCTS

2.1 GENERAL PURPOSE RELAYS

- A. Design general purpose relays to operate as follows:
 - 1. On application of control power to relay coil, contacts reverse state.
 - 2. Contacts return to de-energized state on removal of control power.

- B. Provide general purpose relays with the following requirements:
1. Plug-in blade type.
 2. Contacts:
 - a. Material: Silver cadmium oxide.
 - b. Rating: Minimum of 10A at 120 VAC.
 - c. Two Form C, minimum. Provide number of contacts for each relay as required for application.
 3. Duty cycle: Continuous.
 4. Relay sockets with barrier-type screw terminal connections for external wiring:
 - a. Surface or DIN rail mount.
 - b. Relay hold-down clips.
 5. Lamp indication when relay is energized.
 6. Acceptable manufacturers:
 - a. IDEC, RH Series.
 - b. Or equal.

2.2 DELAY-ON-MAKE (ON-DELAY) TIME DELAY RELAYS

- A. Design delay-on-make time delay relays to operate as follows:
1. On application of voltage to the coil, the relay contacts remain in the "off state" and timing cycle begins. When the set time has elapse the relay contacts transfer to the "on state". The contacts remain in the "on state" until the timer is reset. The timer is reset upon removing the coil voltage. Timer is then ready for the next operation.
- B. Provide delay-on-make time delay relays with the following requirements:
1. Plug-in blade type.
 2. Repeat timing accuracy: Plus or minus 1.5 percent.
 3. Minimum setting: 10 percent of full range.
 4. Duty cycle: Continuous.
 5. Timing range: 0.1 sec. - 10 min.
 6. Contacts:
 - a. Material: Silver cadmium oxide.
 - b. Rating: 10A at 120 VAC.
 - c. Two Form C.
 7. Relay sockets with barrier-type screw terminal connections for external wiring.
 - a. Surface or DIN rail mount.
 - b. Relay hold-down clips.
 8. Acceptable manufacturers:
 - a. IDEC, RTE Series.
 - b. Or equal.

2.3 DELAY-ON-BREAK (OFF-DELAY) TIME DELAY RELAYS

- A. Design delay-on-break time delay relays to operate as follows:
1. Voltage is applied to the coil at all times. When a momentary or maintained start signal is supplied the contacts immediately transfer to "on state". The set time begins when the start signal is removed. When the set time has

elapsed, the contacts transfer to the "off state". The contacts remain in the "off state" until the next start signal is supplied. The timer can be reset by application of a reset input or by removing coil voltage.

- B. Provide delay-on-energize time delay relays with the following requirements:
1. Plug-in blade type.
 2. Repeat timing accuracy: Plus or minus 1.5 percent.
 3. Minimum setting: 10 percent of full range.
 4. Duty cycle: Continuous.
 5. Timing range: 0.1 sec.- 10 min.
 6. Contacts:
 - a. Material: Silver cadmium oxide.
 - b. Rating: 10A at 120 VAC.
 - c. Two Form C.
 7. Relay sockets with barrier-type screw terminal connections for external wiring.
 - a. Surface or DIN rail mount.
 - b. Relay hold-down clips.
 8. Acceptable manufacturers:
 - a. IDEC, RTE Series.
 - b. Or equal.

2.4 MOTORIZED RESET TIMERS (BACKSPIN TIMERS)

- A. Design motorized reset timers (backspin timers) with synchronous timing motor driven reset timer suitable for door panel-mounting and reverse clutch operation to operate as follows:
1. Timing cycle begins when control power is removed from the clutch. Control power must remain applied to the timing motor for the timing cycle to begin.
 2. Four sets of contacts that operate as follows:
 - a. Two sets change state when the "clutch" is energized and return to normal state when the clutch is de-energized.
 - b. One set changes state when the timing cycle has been completed.
 - c. One set changes state at approximately 5 percent of the timing cycle and will stop the timing motor ending the timing cycle
- B. Provide motorized reset timers with the following requirements:
1. Control power: 120 VAC, 60 Hertz.
 2. Timing range to be 0 to 10 minutes.
 3. Calibrated scale and adjustable knob with red progress pointer.
 4. Reset time: One-half second at maximum setting.
 5. Contacts:
 - a. Rating: 10A at 120 VAC, 5 amps at 240 VAC.
 - b. Four Form C that function as described above.
 6. Power indication: Neon pilot light.
 7. Standards recognition: U.L., CSA, and F.M.

8. Acceptable manufacturers:
 - a. Eagle Signal Control, Model HP5-4-A6-01-00.
 - b. Or equal.

2.5 POWER CONTROL RELAYS

- A. Design power control relays to operate as follows:
 1. On application of control power to relay coil, contacts reverse state.
 2. Contacts return to de-energized state on removal of control power
- B. Provide power control relay for heavy-duty switching operation with the following requirements:
 1. Screw-mounted type with screw type terminals.
 2. Contacts:
 - a. Material: Silver cadmium oxide.
 - b. Rating: 25A at 277 VAC, 1 horsepower per movable arm at 120 VAC.
 - c. Two Form C, minimum.
 3. Duty cycle: Continuous.
 4. Coil operating voltage: 120 VAC.
 5. Acceptable manufacturers:
 - a. Potter and Brumfield.
 - b. Or equal.

2.6 MULTIFUNCTION TIMERS

- A. Design multifunction timers with synchronous timing motor drive suitable for flush panel mounting.
- B. Provide multifunction timers with the following requirements:
 1. Control power: 120VAC, 60 Hz.
 2. Running reserve: 100 Hr.
 3. Minimum switch time: 20 minutes.
 4. Interval: 10 minutes.
 5. Contacts:
 - a. Rating: 10A at 120 VAC, 5A at 240 VAC.
 - b. Form C.
 6. Acceptable manufacturers:
 - a. IDEC Model GT3D4AF20.
 - b. Or equal.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install relays in accordance with manufacturer's recommendations.

3.2 CALIBRATION

- A. Calibrate and program equipment to meet system requirements.

3.3 START-UP AND TESTING

- A. Comply with the manufacturer's recommended testing procedures.

END OF SECTION

SECTION 44 42 56.13

WATER BOOSTER PUMPING EQUIPMENT INSTALLATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Install and electrically connect two new centrifugal booster pumps as specified herein and as needed for a complete and functioning unit.
- B. New centrifugal booster pumps noted as shaded in the PRODUCTS section of this specification will be provided by Others. The Provider of the new booster pumps will deliver the booster pumps and motors to Unit Well 20 for installation by the Installation Contractor. **Shaded product information noted in this specification is for the Installation Contractor information only.**

1.2 START UP SERVICES

- A. Comply with pertinent provisions of Section 01 91 58 regarding acceptance of installation and field start-up.

PART 2 - PRODUCTS

2.1 WATER SERVICE PUMPS

- A. Products noted as shaded in this section will be provided by Owner, but installed by Installation Contractor.
- B. Provide two horizontal, flexible coupled, split-case, double suction, single stage, centrifugal type pumps mounted with the motor on a common rigid steel frame base:
 - 1. Capacity of each pump: 2,100 gpm when operating against a total head of 100 feet at a maximum nominal speed of 1,800 rpm.
 - 2. Equip each pump with single mechanical seals with adequate flushing (either with internal or through external brass 1/4" piping) GR 4140 carbon steel shaft, stainless steel sleeves, bronze impeller with renewable wear rings, bronze or cast iron wear rings, and grease lubricated ball bearings. Provide 1/4-inch NPT gauge taps on suction and discharge flange openings.
 - 3. Provide bronze alloy impeller with less than 5% zinc, suitable for continuous contact with water containing 2 milligrams per liter free chlorine.
 - 4. Provide a one piece bent form steel base plate, with provisions for anchoring to concrete base and grouting in place.
 - 5. Provide with manufacturer's prime coat paint on all metallic surfaces to accept an exterior non-immersion, Tnemec System Series 1075 Endura-Shield final coat, with Omnithane and Hi-build Epoxy 1st and 2nd coats.

WATER BOOSTER PUMPING EQUIPMENT INSTALLATION

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6. Connect pump to motor with a flexible coupling.
 - a. Acceptable manufacturer:
 - (1) Woods Sure-Flex, or equal.
 - b. Non-metallic elements.
 - c. Provide OSHA approved coupling guard.

C. Provide continuous duty rated motor with inverter duty grade insulation system, suitable to use with a VFD and meeting NEMA MG-1 Part 31, with sealed grease lubricated bearings, copper wound for 480 volt, 3 phase, 60 Hertz A.C., with Class F non-hygroscopic insulation for 40 degree C temperature rise over 40 degree C. ambient temperature, and a service factor of 1.15. Efficiency rating shall be premium efficient.

1. Motor to be shielded drip-proof design.
2. Provide motor with manufacturer's prime and final coatings with no field painting require.
3. Provide adequate horsepower to be non-overloading throughout the pump capacity-head curve, minimum 75 Hp.
4. Acceptable motor manufacturers: US Motors, GE, Baldor, or Marathon Electric.

D. Base Bid pump manufacturers:

1. Fairbanks Morse; Type 2800, size 6" 2822A,
2. Deming Pumps or Pre-approved equal.

E. Alternate pump manufacturers/providers must meet the following criteria:

1. Pre-approved by Owner as allowed in Bidding Documents.
2. Nominal 1,800 rpm speed, only.
3. Published pump efficiency greater than 83%.
4. Operating head (at maximum pump output at far right hand side of curve) of 65 feet.
5. Minimum shut off head (at 0 gpm) of 140 feet.
6. Proof of equal materials of construction, quality, durability, appearance, strength and design characteristics.
7. Nationally recognized pump manufacturer with satisfactory installation and performance record within US and Wisconsin.
8. Local and responsive service within 60 miles of installation.

2.2 WARRANTY

- A. Provide two year warranty against defective equipment in compliance with pertinent provisions of Supplementary Conditions.

PART 3 - EXECUTION

3.1 BOOSTER PUMP PROVIDER INSTALLATION REQUIREMENTS

- A. Pump Provider shall deliver water booster pumps and motors on frame to job site for installation by General Contractor. Coordinate delivery per General Contractor's construction schedule. Delivery shall include shipment to site and safe off-loading from delivery vehicle.
- B. Pump Provider shall provide General Contractor (and General Contractor's designated mechanical and electrical subcontractors) with manufacturer's recommendations for proper installation.
- C. Pump Provider shall provide inspection of final installation and prepare an installation report prior to final field testing and acceptance of pumping units by Owner.
- D. Pump Provider shall provide an extended 2-year warranty covering defective parts on booster pumping equipment to Owner at time of delivery.

3.2 BOOSTER PUMP INSTALLATION REQUIREMENTS

- A. Install pumps in accordance with manufacturer's recommendation including concrete bases, grout, anchoring, final alignment, piping and electrical connections.
- B. Install 1/4-inch steel nipple with shut-off cock and threaded end cap on each pump suction and discharge nozzle for pressure gauge connections.
- C. Install 1/2-inch piping with isolation valve from vent on top of each pump casing. Terminate in downturned elbow with 24 mesh stainless steel screen.
- D. Test in field and submit startup report.

END OF SECTION

SECTION 44 42 56.15

TEMPORARY WATER BOOSTER PUMPING EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide temporary manually operated water booster pumping equipment for delivery of a minimum of 1,000 gpm at existing hydraulic conditions of 80 feet of TDH with 20 psi of suction pressure and 55 psi of discharge pressure. Temporary water booster equipment may consist of one of the existing Unit Well 20 water booster pumps (removed and salvaged as part of Project), or new water booster equipment. The intent of temporary water booster equipment is to provide for emergency water supply for the Utility's high pressure zone in the event of a mechanical or electrical failure of the second existing or newly installed booster pump during Project renovations. Temporary connections must include all temporary piping, supports, bracing, shelter from weather, and electrical connections.

1.2 SUBMITTALS

- A. Submit temporary pump schematic drawings in compliance with pertinent provisions of Section 01 33 01 including pump dimension drawings, motor data sheet, water connections, and appurtenances as required.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 01 66 11.
- B. Temporary water booster pumping equipment must be available and ready to use within 24 hours of removal of first booster pump.

1.4 START UP SERVICES

- A. Comply with pertinent provisions of Section 01 91 58 regarding acceptance of installation and field start-up.

PART 2 - PRODUCTS

2.1 TEMPORARY WATER SERVICE PUMPS

- A. Temporary pump shall include the following .
 1. Minimum capacity of pump: 1,000 gpm when operating against a total existing differential head of 80 feet.
 2. Equip temporary pump with new food grade hose (minimum 8-inch) or water main piping to connect from low pressure hydrant to high pressure hydrant on site.
 3. Suction piping to be equipped with isolation valve and pressure gage.

TEMPORARY WATER BOOSTER PUMPING EQUIPMENT

44 42 56.15-1 (120581.40)

4. Discharge piping to be equipped with check valve, pressure gage and isolation valve.
5. Provide temporary electrical connections to existing MCC or temporary electrical equipment with appropriate starter to run booster pump manually.
6. Maintain sanitary quality of water through piping connections, pump, and temporary piping.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Installation of temporary water booster pumping equipment, including concrete bases, grout, anchoring, final alignment, piping and electrical connections, pressure gauges, and isolation valves, shall be by General Contractor.
- B. Temporary water booster pumping equipment must be available and ready to use within 24 hours of removal of first booster pump.
- C. Temporary booster pumping equipment shall be able to be connected to on site hydrants within less than 60 minutes by Contractor or Utility staff.
- D. Provide sanitary pumping connections at all times.
- E. Labor and motive power or fuel for temporary operation to be provided by Utility.
- F. Temporary pumping equipment shall remain in place until both new booster pumps are disinfected, tested, and approved for operation.

END OF SECTION



Department of Public Works
City Engineering Division

Robert F. Phillips, P.E.
City Engineer

City-County Building, Room 115
210 Martin Luther King, Jr. Boulevard
Madison, Wisconsin 53703
FAX 608 264 9275
www.cityofmadison.com

608 266 4751

Assistant City Engineer
Michael R. Dailey, P.E.

Principal Engineers
Christina M. Bachmann, P.E.
John S. Fahrney, P.E.
Gregory T. Fries, P.E.
Christopher J. Petykowski, P.E.

Facilities & Sustainability
Jeanne E. Hoffman, Manager
James C. Whitney, A.I.A.

Operations Supervisor
Kathleen M. Cryan

GIS Manager
David A. Davis, R.L.S.

Financial Officer
Steven B. Danner-Rivers

Hydrogeologist
Brynn Bemis

5/23/13

NOTICE OF ADDENDUM

ADDENDUM NO. 1

UNIT WELL 20 PUMP AND MCC UPGRADES

CONTRACT NO. 7045

Revise and amend the contract document(s) for the above project as stated in this addendum, otherwise, the original document shall remain in effect.

Bid Deadline on Bid Express has been changed to 1:00 PM. It is correct in the specifications.

Please acknowledge this addendum on page E1 of the contract documents and/or in Section E: Bidder's Acknowledgement on Bid Express.

Electronic version of these documents can be found on Bid Express at <https://www.bidexpress.com/>.

If you are unable to download plan revisions associated with the addendum, please contact the Engineering office at 608-266-4751 receive the material by another route.

Robert F. Phillips, City Engineer



SECTION E: BIDDERS ACKNOWLEDGEMENT

UPGRADE BOOSTER PUMPS AT UNIT WELL 20

CONTRACT NO. 7045

Bidder must state a Unit Price and Total Bid for each item. The Total Bid for each item must be the product of quantity, by Unit Price. The Grand Total must be the sum of the Total Bids for the various items. In case of multiplication errors or addition errors, the Grand Total with corrected multiplication and/or addition shall determine the Grand Total bid for each contract. The Unit Price and Total Bid must be entered numerically in the spaces provided. All words and numbers shall be written in ink.

1. The undersigned having familiarized himself/herself with the Contract documents, including Advertisement for Bids, Instructions to Bidders, Form of Proposal, City of Madison Standard Specifications for Public Works Construction - 2013 Edition thereto, Form of Agreement, Form of Bond, and Addenda issued and attached to the plans and specifications on file in the office of the City Engineer, hereby proposes to provide and furnish all the labor, materials, tools, and expendable equipment necessary to perform and complete in a workmanlike manner the specified construction on this project for the City of Madison; all in accordance with the plans and specifications as prepared by the City Engineer, including Addenda to the Contract Nos. 1 through 1 issued thereto, at the prices for said work as contained in this proposal. (Electronic bids submittals shall acknowledge addendum under Section E and shall not acknowledge here)
2. If awarded the Contract, we will initiate action within seven (7) days after notification or in accordance with the date specified in the contract to begin work and will proceed with diligence to bring the project to full completion within the number of work days allowed in the Contract or by the calendar date stated in the Contract.
3. The undersigned Bidder or Contractor certifies that he/she is not a party to any contract, combination in form of trust or otherwise, or conspiracy in restraint of trade or commerce or any other violation of the anti-trust laws of the State of Wisconsin or of the United States, with respect to this bid or contract or otherwise.
4. I hereby certify that I have met the Bid Bond Requirements as specified in Section 102.5. (IF BID BOND IS USED, IT SHALL BE SUBMITTED ON THE FORMS PROVIDED BY THE CITY. FAILURE TO DO SO MAY RESULT IN REJECTION OF THE BID).
5. I hereby certify that all statements herein are made on behalf of Monona Plumbing and Fire Protection, Inc. (name of corporation, partnership, or other business entity) a corporation organized and existing under the laws of the State of Wisconsin; or a partnership consisting of _____, an individual trading as _____, of the City of Madison State of Wisconsin; that I have examined and carefully prepared this Proposal, from the plans and specifications and have checked the same in detail before submitting this Proposal; that I have fully authority to make such statements and submit this Proposal in (its, their) behalf; and that the said statements are true and correct.

Brent Williams

SIGNATURE

Brent Williams, President

TITLE, IF ANY

Sworn and subscribed to before me this 24th day of May, 20 13.

(Notary Public or other officer authorized to administer oaths)

My Commission Expires 11/16/2014

Bidders shall not add any conditions or qualifying statements to this Proposal.



Marie Beres

SECTION F: DISCLOSURE OF OWNERSHIP & BEST VALUE CONTRACTING

**UPGRADE BOOSTER PUMPS AT UNIT WELL 20
CONTRACT NO. 7045**

State of Wisconsin
Department of Workforce Development
Equal Rights Division
Labor Standards Bureau

Disclosure of Ownership

Notice required under Section 15.04(1)(m), Wisconsin Statutes. The statutory authority for the use of this form is prescribed in Sections 66.0903(12)(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.

- (1) On the date a contractor submits a bid to or completes negotiations with a state agency or local governmental unit, on a project subject to Section 66.0903 or 103.49, Wisconsin Statutes, the contractor shall disclose to such state agency or local governmental unit 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), 103.49(2) and 103.50(2), Wisconsin Statutes.
- (3) This form must ONLY be filed, with the state agency or local governmental unit that will be awarding the contract, if **both (A) and (B) are met.**
 - (A) The contractor, or a shareholder, officer or partner of the contractor:
 - (1) Owns at least a 25% interest in the "other construction business", indicated below, on the date the contractor submits a bid or completes negotiations.
 - (2) Or has owned at least a 25% interest in the "other construction business" at any time within the preceding three (3) years.
 - (B) The Wisconsin Department of Workforce Development (DWD) has determined that the "other construction business" has failed to pay the prevailing wage rate or time and one-half the required hourly basic rate of pay, for 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

Not Applicable

Name of Business

Street Address or P O Box

City

State

Zip Code

Name of Business

Street Address or P O Box

City

State

Zip Code

Name of Business

Street Address or P O Box

City

State

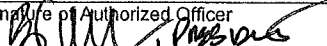
Zip Code

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

Print the Name of Authorized Officer

Brent Williams

Signature of Authorized Officer



Date Signed

05/24/2013

Name of Corporation, Partnership or Sole Proprietorship

Monona Plumbing and Fire Protection, Inc.

Street Address or P O Box

3126 Watford Way

City

Madison

State

WI

Zip Code

53713

If you have any questions call (608) 266-0028

ERD-7777-E (R. 09/2003)

**UPGRADE BOOSTER PUMPS AT UNIT WELL 20
CONTRACT NO. 7045**

Best Value Contracting

1. The Contractor shall indicate the non-apprenticeable trades used on this contract.

None

2. Madison General Ordinance (M.G.O.), 33.07(7), does provide for some exemptions from the active apprentice requirement. Apprenticeable trades are those trades considered apprenticeable by the State of Wisconsin. Please check applicable box if you are seeking an exemption.

- Contractor has a total skilled workforce of four or less individuals in all apprenticeable trades combined.
- No available trade training program; The Contractor has been rejected by the only available trade training program, or there is no trade training program within 90 miles.
- Contractor is not using an apprentice due to having a journey worker on layoff status, provided the journey worker was employed by the contractor in the past six months.
- First-time Contractor on City of Madison Public Works contract requests a onetime exemption but intends to comply on all future contracts and is taking steps typical of a "good faith" effort.
- Contractor has been in business less than one year.
- Contractor doesn't have enough journeyman trade workers to qualify for a trade training program in that respective trade

3. The Contractor shall indicate on the following section which apprenticeable trades are to be used on this contract. Compliance with active apprenticeship, to the extent required by M.G.O. 33.07(7), shall be satisfied by documentation from an applicable trade training body; an apprenticeship contract with the Wisconsin Department of Workforce Development or a similar agency in another state; or the U.S Department of Labor. This documentation is required prior to the Contractor beginning work on the project site.

- The Contractor has reviewed the list and shall not use any apprenticeable trades on this project.

LIST APPRENTICABLE TRADES (check all that apply to your work to be performed on this contract)

- BRICKLAYER
- CARPENTER
- CEMENT MASON / CONCRETE FINISHER
- CEMENT MASON (HEAVY HIGHWAY)
- CONSTRUCTION CRAFT LABORER
- DATA COMMUNICATION INSTALLER
- ELECTRICIAN
- ENVIRONMENTAL SYSTEMS TECHNICIAN / HVAC SERVICE TECH/HVAC INSTALL / SERVICE
- GLAZIER
- HEAVY EQUIPMENT OPERATOR / OPERATING ENGINEER
- INSULATION WORKER (HEAT & FROST)
- IRON WORKER
- IRON WORKER (ASSEMBLER, METAL BLDGS)
- PAINTER & DECORATOR
- PLASTERER
- PLUMBER
- RESIDENTIAL ELECTRICIAN
- ROOFER & WATER PROOFER
- SHEET METAL WORKER
- SPRINKLER FITTER
- STEAMFITTER
- STEAMFITTER (REFRIGERATION)
- STEAMFITTER (SERVICE)
- TAPER & FINISHER
- TELECOMMUNICATIONS (VOICE, DATA & VIDEO) INSTALLER-TECHNICIAN
- TILE SETTER

UPGRADE BOOSTER PUMPS AT UNIT WELL 20
CONTRACT NO. 7045

Small Business Enterprise Compliance Report

This information may be submitted electronically through
Bid Express or submitted with bid in sealed envelope.

Cover Sheet

Prime Bidder Information

Company: Monona Plumbing and Fire Protection, Inc.

Address: 3126 Watford Way, Madison, WI 53713

Telephone Number: 608 273-4556

Fax Number: 608 273-8492

Contact Person/Title: Dan Siehr, Mechanical Department Manager

Prime Bidder Certification

I, Brent Williams President of
Name Title

Monona Plumbing and Fire Protection, Inc. certify that the information
Company

contained in this SBE Compliance Report is true and correct to the best of my knowledge and belief.

Marie Beres
Witness' Signature Marie Beres

Brent Williams President
Bidder's Signature Brent Williams

5-24-13
Date

**UPGRADE BOOSTER PUMPS AT UNIT WELL 20
CONTRACT NO. 7045**

Small Business Enterprise Compliance Report

Summary Sheet

SBE Subcontractors Who Are NOT Suppliers

Name(s) of SBEs Utilized	Type of Work	% of Total Bid Amount
None		%
		%
		%
		%
		%
		%
		%
		%
		%
		%
		%
		%
		%
		%
		%
		%
		%
		%
		%
Subtotal SBE who are NOT suppliers:		%

SBE Subcontractors Who Are Suppliers

Name(s) of SBEs Utilized	Type of Work	% of Total Bid Amount
None		%
		%
		%
		%
		%
		%
		%
		%
		%
Subtotal Contractors who are suppliers:	<u>0</u> % x 0.6 = <u>0</u> % (discounted to 60%)	
Total Percentage of SBE Utilization:	<u>0</u> %	

PROPOSAL

NAME OF BIDDER: MONONA PLUMBING AND FIRE PROTECTION, INC.

Contract Name: UPGRADE BOOSTER PUMPS AT UNIT WELL 20

Contract No. 7045

ITEM	TYPE OF WORK	ESTIMATED QUANTITIES		UNIT PRICE BID	TOTAL BID
ACCOUNT NO. EW01-58599-810458					
1	All work associated with upgrade to booster pumps at Unit Well 20 along with MCC and other improvements.	1.0	LS		\$ 274,920.00
					\$ -
					\$ -
					\$ -
					\$ -
					\$ -
GRAND TOTAL					\$274,920.00



SECTION G: BID BOND

KNOW ALL MEN BY THESE PRESENT, THAT Monona Plumbing & Fire Protection, Inc. (a corporation of the State of Wisconsin) (individual), (partnership), hereinafter referred to as the "Principal") and Fidelity & Deposit Company of Maryland, a corporation of the State of Maryland (hereinafter referred to as the "Surety") and licensed to do business in the State of Wisconsin, are held and firmly bound unto the City of Madison, (hereinafter referred to as the "Obligee"), in the sum of five per cent (5%) of the amount of the total bid or bids of the Principal herein accepted by the Obligee, for the payment of which the Principal and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

The conditions of this obligation are such that, whereas the Principal has submitted, to the City of Madison a certain bid, including the related alternate, and substitute bids attached hereto and hereby made a part hereof, to enter into a contract in writing for the construction of:

UPGRADE BOOSTER PUMPS AT UNIT WELL 20 CONTRACT NO. 7045

1. If said bid is rejected by the Obligee, then this obligation shall be void.
2. If said bid is accepted by the Obligee and the Principal shall execute and deliver a contract in the form specified by the Obligee (properly completed in accordance with said bid) and shall furnish a bond for his/her faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said bid, then this obligation shall be void.

If said bid is accepted by the Obligee and the Principal shall fail to execute and deliver the contract and the performance and payment bond noted in 2. above executed by this Surety, or other Surety approved by the City of Madison, all within the time specified or any extension thereof, the Principal and Surety agree jointly and severally to forfeit to the Obligee as liquidated damages the sum mentioned above, it being understood that the liability of the Surety for any and all claims hereunder shall in no event exceed the sum of this obligation as stated, and it is further understood that the Principal and Surety reserve the right to recover from the Obligee that portion of the forfeited sum which exceed the actual liquidated damages incurred by the Obligee.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by an extension of the time within which the Obligee may accept such bid, and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, on the day and year set forth below.

Seal Monona Plumbing & Fire Protection, Inc. 5/24/13
Principal _____ Date _____

By: [Signature] _____

Fidelity & Deposit Company of Maryland
Name of Surety _____

By: [Signature] 5/24/13
Kelsey Jacobson, Attorney in Fact _____ Date _____

This certifies that I have been duly licensed as an agent for the above company in Wisconsin under License No. 2564601 for the year 2013, and appointed as attorney in fact with authority to execute this bid bond and the payment and performance bond referred to above, which power of attorney has not been revoked.

5/24/13
Date _____

[Signature]
Agent Kelsey Jacobson, Hausmann-Johnson Insurance

700 Regent St.
Address _____

Madison, WI 53715
City, State and Zip Code _____

(608) 257-3795
Telephone Number _____

NOTE TO SURETY & PRINCIPAL

The bid submitted which this bond guarantees may be rejected if the following instrument is not attached to this bond:

Power of Attorney showing that the agent of Surety is currently authorized to execute bonds on behalf of the Surety, and in the amounts referenced above.

**Power of Attorney
FIDELITY AND DEPOSIT COMPANY OF MARYLAND**

KNOW ALL MEN BY THESE PRESENTS: That the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, a corporation of the State of Maryland, by DAVID S. HEWETT, Vice President, and GREGORY E. MURRAY, Assistant Secretary, in pursuance of authority granted by Article VI, Section 2, of the By-Laws of said Company, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, does hereby nominate, constitute and appoint **Judith A. WALKER, Sheila M. DICKEY, Steven L. SQUIRES, Jeffrey P. HAUSMANN, Timothy HAUSMANN, Patrick A. MCKENNA, Brooke L. PARKER and Kelsey JACOBSON, all of Madison, Wisconsin, EACH** its true and lawful agent and Attorney-in-Fact to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings**, and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Company, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the Company at its office in Baltimore, Md., in their own proper persons. This power of attorney revokes that issued on behalf of Judith A. WALKER, Sheila M. DICKEY, Steven L. SQUIRES, Jeffrey P. HAUSMANN, Timothy HAUSMANN, Patrick A. MCKENNA, Brooke L. PARKER, dated March 26, 2010.

The said Assistant Secretary does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article VI, Section 2, of the By-Laws of said Company, and is now in force.

IN WITNESS WHEREOF, the said Vice-President and Assistant Secretary have hereunto subscribed their names and affixed the Corporate Seal of the said FIDELITY AND DEPOSIT COMPANY OF MARYLAND, this 20th day of October, A.D. 2010.

ATTEST:

FIDELITY AND DEPOSIT COMPANY OF MARYLAND



Gregory E. Murray

By:

David S. Hewett

Gregory E. Murray Assistant Secretary

David S. Hewett

David S. Hewett Vice President

State of Maryland }
City of Baltimore } ss:

On this 20th day of October, A.D. 2010, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, came DAVID S. HEWETT, Vice President, and GREGORY E. MURRAY, Assistant Secretary of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and they each acknowledged the execution of the same, and being by me duly sworn, severally and each for himself deposed and saith, that they are the said officers of the Company aforesaid, and that the seal affixed to the preceding instrument is the Corporate Seal of said Company, and that the said Corporate Seal and their signatures as such officers were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporation.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.



Maria D. Adamski

Maria D. Adamski

Maria D. Adamski Notary Public

My Commission Expires: July 8, 2015

EXTRACT FROM BY-LAWS OF FIDELITY AND DEPOSIT COMPANY OF MARYLAND

"Article VI, Section 2. The Chairman of the Board, or the President, or any Executive Vice-President, or any of the Senior Vice-Presidents or Vice-Presidents specially authorized so to do by the Board of Directors or by the Executive Committee, shall have power, by and with the concurrence of the Secretary or any one of the Assistant Secretaries, to appoint Resident Vice-Presidents, Assistant Vice-Presidents and Attorneys-in-Fact as the business of the Company may require, or to authorize any person or persons to execute on behalf of the Company any bonds, undertakings, recognizances, stipulations, policies, contracts, agreements, deeds, and releases and assignments of judgements, decrees, mortgages and instruments in the nature of mortgages,...and to affix the seal of the Company thereto."

CERTIFICATE

I, the undersigned, Assistant Secretary of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that the Vice-President who executed the said Power of Attorney was one of the additional Vice-Presidents specially authorized by the Board of Directors to appoint any Attorney-in-Fact as provided in Article VI, Section 2, of the By-Laws of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed."

IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seal of the said Company,

this 24 day of May, 2013.

John D. Baur

Assistant Secretary

SECTION H: AGREEMENT

THIS AGREEMENT made this 20 day of JUNE in the year Two Thousand and Thirteen between MONONA PLUMBING & FIRE PROTECTION, INC. hereinafter called the Contractor, and the City of Madison, Wisconsin, hereinafter called the City.

WHEREAS, the Common Council of the said City of Madison under the provisions of a resolution adopted JUNE 18, 2013, and by virtue of authority vested in the said Council, has awarded to the Contractor the work of performing certain construction.

NOW, THEREFORE, the Contractor and the City, for the consideration hereinafter named, agree as follows:

1. **Scope of Work.** The Contractor shall, perform the construction, execution and completion of the following listed complete work or improvement in full compliance with the Plans, Specifications, Standard Specifications, Supplemental Specifications, Special Provisions and contract; perform all items of work covered or stipulated in the proposal; perform all altered or extra work; and shall furnish, unless otherwise provided in the contract, all materials, implements, machinery, equipment, tools, supplies, transportation, and labor necessary to the prosecution and completion of the work or improvements:

UPGRADE BOOSTER PUMPS AT UNIT WELL 20 CONTRACT NO. 7045

2. **Completion Date/Contract Time.** Construction work must begin within seven (7) calendar days after the date appearing on mailed written notice to do so shall have been sent to the Contractor and shall be carried on at a rate so as to secure full completion SEE SPECIAL PROVISIONS, the rate of progress and the time of completion being essential conditions of this Agreement.
3. **Contract Price.** The City shall pay to the Contractor at the times, in the manner and on the conditions set forth in said specifications, the sum TWO HUNDRED SEVENTY-FOUR THOUSAND NINE HUNDRED TWENTY (\$274,920.00) Dollars being the amount bid by such Contractor and which was awarded to him/her as provided by law.
4. **Wage Rates for Employees of Public Works Contractors**

General and Authorization. The Contractor shall compensate its employees at the prevailing wage rate in accordance with section 66.0903, Wis. Stats., DWD 290 of the Wisconsin Administrative Code and as hereinafter provided.

"Public Works" shall include building or work involving the erection, construction, remodeling, repairing or demolition of buildings, parking lots, highways, streets, bridges, sidewalks, street lighting, traffic signals, sanitary sewers, water mains and appurtenances, storm sewers, and the grading and landscaping of public lands.

"Building or work" includes construction activity as distinguished from manufacturing, furnishing of materials, or servicing and maintenance work, except for the delivery of mineral aggregate such as sand, gravel, bituminous asphaltic concrete or stone which is incorporated into the work under contract with the City by depositing the material directly in final place from transporting vehicle.

"Erection, construction, remodeling, repairing" means all types of work done on a particular building or work at the site thereof in the construction or development of the project, including without limitation, erecting, construction, remodeling, repairing, altering, painting, and decorating, the transporting of materials and supplies to or from the building or work done by the employees of the Contractor, Subcontractor, or Agent thereof, and the manufacturing or furnishing of materials, articles, supplies or equipment on the site of the building or work, by persons employed by the Contractor, Subcontractor, or Agent thereof.

"Employees working on the project" means laborers, workers, and mechanics employed directly upon the site of work.

"Laborers, Workers, and Mechanics" include pre-apprentices, helpers, trainees, learners and properly registered and indentured apprentices but exclude clerical, supervisory, and other personnel not performing manual labor.

Establishment of Wage Rates. The Department of Public Works shall periodically obtain a current schedule of prevailing wage rates from DWD. The schedule shall be used to establish the City of Madison Prevailing Wage Rate Schedule for Public Works Construction (prevailing wage rate). The Department of Public Works may include known increases to the prevailing wage rate which can be documented and are to occur on a future specific date. The prevailing wage rate shall be included in public works contracts subsequently negotiated or solicited by the City. Except for known increases contained within the schedule, the prevailing wage rate shall not change during the contract. The approved wage rate is attached hereto.

Workforce Profile. The Contractor shall, at the time of signature of the contract, notify the City Engineer in writing of the names and classifications of all the employees of the Contractor, Subcontractors, and Agents proposed for the work. In the alternative, the Contractor shall submit in writing the classifications of all the employees of the Contractor, Subcontractors and Agents and the total number of hours estimated in each classification for the work. This workforce profile(s) shall be reviewed by the City Engineer who may, within ten (10) days, object to the workforce profile(s) as not being reflective of that which would be required for the work. The Contractor may request that the workforce profile, or a portion of the workforce profile, be submitted after the signature of the contract but at least ten (10) days prior to the work commencing. Any costs or time loss resulting from modifications to the workforce profile as a result of the City Engineer's objections shall be the responsibility of the Contractor.

Payrolls and Records. The Contractor shall keep weekly payroll records setting forth the name, address, telephone number, classification, wage rate and fringe benefit package of all the employees who work on the contract, including the employees of the Contractor's subcontractors and agents. Such weekly payroll records must include the required information for all City contracts and all other contracts on which the employee worked during the week in which the employee worked on the contract. The Contractor shall also keep records of the individual time each employee worked on the project and for each day of the project. Such records shall also set forth the total number of hours of overtime credited to each such employee for each day and week and the amount of overtime pay received in that week. The records shall set forth the full weekly wages earned by each employee and the actual hourly wage paid to the employee.

The Contractor shall submit the weekly payroll records, including the records of the Contractor's subcontractors and agents, to the City Engineer for every week that work is being done on the contract. The submittal shall be within twenty-one (21) calendar days of the end of the Contractor's weekly pay period.

Employees shall receive the full amounts accrued at the time of the payment, computed at rates not less than those stated in the prevailing wage rate and each employee's rate shall be determined by the work that is done within the trade or occupation classification which should be properly assigned to the employee.

An employee's classification shall not be changed to a classification of a lesser rate during the contract. If, during the term of the contract, an employee works in a higher pay classification than the one which was previously properly assigned to the employee, then that employee shall be considered to be in the higher pay classification for the balance of the contract, receive the appropriate higher rate of pay, and she/he shall not receive a lesser rate during the balance of the contract. For purposes of clarification, it is noted that there is a distinct difference between working in a different classification with higher pay and doing work within a classification that has

varying rates of pay which are determined by the type of work that is done within the classification. For example, the classification "Operating Engineer" provides for different rates of pay for various classes of work and the Employer shall compensate an employee classified as an "Operating Engineer" based on the highest class of work that is done in one day. Therefore, an "Operating Engineer's" rate may vary on a day to day basis depending on the type of work that is done, but it will never be less than the base rate of an "Operating Engineer". Also, as a matter of clarification, it is recognized that an employee may work in a higher paying classification merely by chance and without prior intention, calculation or design. If such is the case and the performance of the work is truly incidental and the occurrence is infrequent, inconsequential and does not serve to undermine the single classification principle herein, then it may not be required that the employee be considered to be in the higher pay classification and receive the higher rate of pay for the duration of the contract. However, the Contractor is not precluded or prevented from paying the higher rate for the limited time that an employee performs work that is outside of the employee's proper classification.

Questions regarding an employee's classification, rate of pay or rate of pay within a classification, shall be resolved by reference to the established practice that predominates in the industry and on which the trade or occupation rate/classification is based. Rate of pay and classification disputes shall be resolved by relying upon practices established by collective bargaining agreements and guidelines used in such determination by appropriate recognized trade unions operating within the City of Madison.

The Contractor, its Subcontractors and Agents shall submit to interrogation regarding compliance with the provisions of this ordinance.

Mulcting of the employees by the Contractor, Subcontractor, and Agents on Public Works contracts, such as by kickbacks or other devices, is prohibited. The normal rate of wage of the employees of the Contractor, Subcontractor, and Agents shall not be reduced or otherwise diminished as a result of payment of the prevailing wage rate on a public works contract.

Hourly contributions. Hourly contributions shall be determined in accordance with the prevailing wage rate and with DWD. 290.01(10), Wis. Admin. Code.

Apprentices and Subjourney persons. Apprentices and sub journeypersons performing work on the project shall be compensated in accordance with the prevailing wage rate and with DWD 290.02, and 290.025, respectively, Wis. Admin. Code.

Straight Time Wages. The Contractor may pay straight time wages as determined by the prevailing wage rate and DWD 290.04, Wis. Admin. Code.

Overtime Wages. The Contractor shall pay overtime wages as required by the prevailing wage rate and DWD 290.05, Wis. Admin. Code.

Posting of Wage Rates and Hours. A clearly legible copy of the prevailing wage rate, together with the provisions of Sec. 66.0903(10)(a) and (11)(a), Wis. Stats., shall be kept posted in at least one conspicuous and easily accessible place at the project site by the Contractor and such notice shall remain posted during the full time any laborers, workers or mechanics are employed on the contract.

Evidence of Compliance by Contractor. Upon completion of the contract, the Contractor shall file with the Department of Public Works an affidavit stating:

- a. That the Contractor has complied fully with the provisions and requirements of Sec. 66.0903(3), Wis. Stats., and Chapter DWD 290, Wis. Admin. Code; the Contractor has received evidence of compliance from each of the agents and subcontractors; and the names and addresses of all of the subcontractors and agents who worked on the contract.

- b. That full and accurate records have been kept, which clearly indicate the name and trade or occupation of every laborer, worker or mechanic employed by the Contractor in connection with work on the project. The records shall show the number of hours worked by each employee and the actual wages paid therefore; where these records will be kept and the name, address and telephone number of the person who will be responsible for keeping them. The records shall be retained and made available for a period of at least three (3) years following the completion of the project of public works and shall not be removed without prior notification to the municipality.

Evidence of Compliance by Agent and Subcontractor. Each agent and subcontractor shall file with the Contractor, upon completion of their portion of the work on the contract an affidavit stating that all the provisions of Sec. 66.0903(3), Wis. Stats., have been fully complied with and that full and accurate records have been kept, which clearly indicate the name and trade or occupation of every laborer, worker or mechanic employed by the Contractor in connection with work on the project. The records shall show the number of hours worked by each employee and the actual wages paid therefore; where these records shall be kept and the name, address and telephone number of the person who shall be responsible for keeping them. The records shall be retained and made available for a period of at least three (3) years following the completion of the project of public works and shall not be removed without prior notification to the municipality.

Failure to Comply with the Prevailing Wage Rate. If the Contractor fails to comply with the prevailing wage rate, she/he shall be in default on the contract.

5. **Affirmative Action.** In the performance of the services under this Agreement the Contractor agrees not to discriminate against any employee or applicant because of race, religion, marital status, age, color, sex, disability, national origin or ancestry, income level or source of income, arrest record or conviction record, less than honorable discharge, physical appearance, sexual orientation, political beliefs, or student status. The Contractor further agrees not to discriminate against any subcontractor or person who offers to subcontract on this contract because of race, religion, color, age, disability, sex or national origin.

The Contractor agrees that within thirty (30) days after the effective date of this agreement, the Contractor will provide to the City Affirmative Action Division certain workforce utilization statistics, using a form to be furnished by the City.

If the contract is still in effect, or if the City enters into a new agreement with the Contractor, within one year after the date on which the form was required to be provided, the Contractor will provide updated workforce information using a second form, also to be furnished by the City. The second form will be submitted to the City Affirmative Action Division no later than one year after the date on which the first form was required to be provided.

The Contractor further agrees that, for at least twelve (12) months after the effective date of this contract, it will notify the City Affirmative Action Division of each of its job openings at facilities in Dane County for which applicants not already employees of the Contractor are to be considered. The notice will include a job description, classification, qualifications and application procedures and deadlines. The Contractor agrees to interview and consider candidates referred by the Affirmative Action Division if the candidate meets the minimum qualification standards established by the Contractor, and if the referral is timely. A referral is timely if it is received by the Contractor on or before the date started in the notice.

Articles of Agreement Article I

The Contractor shall take affirmative action in accordance with the provisions of this contract to insure that applicants are employed, and that employees are treated during employment without regard to race, religion, color, age, marital status, disability, sex or national original and that the

employer shall provide harassment free work environment for the realization of the potential of each employee. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation and selection for training including apprenticeship insofar as it is within the control of the Contractor. The Contractor agrees to post in conspicuous places available to employees and applicants notices to be provided by the City setting out the provisions of the nondiscrimination clauses in this contract.

Article II

The Contractor shall in all solicitations or advertisements for employees placed by or on behalf of the Contractors state that all qualified or qualifiable applicants will be employed without regard to race, religion, color, age, marital status, disability, sex or national origin.

Article III

The Contractor shall send to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding a notice to be provided by the City advising the labor union or worker's representative of the Contractor's equal employment opportunity and affirmative action commitments. Such notices shall be posted in conspicuous places available to employees and applicants for employment.

Article V

The Contractor agrees that it will comply with all provisions of the Affirmative Action Ordinance of the City of Madison, including the contract compliance requirements. The Contractor agrees to submit the model affirmative action plan for public works contractors in a form approved by the Director of Affirmative Action.

Article VI

The Contractor will maintain records as required by Section 39.02(9)(f) of the Madison General Ordinances and will provide the City Affirmative Action Division with access to such records and to persons who have relevant and necessary information, as provided in Section 39.02(9)(f). The City agrees to keep all such records confidential, except to the extent that public inspection is required by law.

Article VII

In the event of the Contractor's or subcontractor's failure to comply with the Equal Employment Opportunity and Affirmative Action Provisions of this contract or Section 39.03 and 39.02 of the Madison General Ordinances, it is agreed that the City at its option may do any or all of the following:

1. Cancel, terminate or suspend this Contract in whole or in part.
2. Declare the Contractor ineligible for further City contracts until the Affirmative Action requirements are met.
3. Recover on behalf of the City from the prime Contractor 0.5 percent of the contract award price for each week that such party fails or refuses to comply, in the nature of liquidated damages, but not to exceed a total of five percent (5%) of the contract price, or five thousand dollars (\$5,000), whichever is less. Under public works contracts, if a subcontractor is in noncompliance, the City may recover liquidated damages from the prime Contractor in the manner described above. The preceding sentence shall not be construed to prohibit a prime Contractor from recovering the amount of such damage from the non-complying subcontractor.

Article VIII

The Contractor shall include the above provisions of this contract in every subcontract so that such provisions will be binding upon each subcontractor. The Contractor shall take such action with respect to any subcontractor as necessary to enforce such provisions, including sanctions provided for noncompliance.

Article IX

The Contractor shall allow the maximum feasible opportunity to small business enterprises to compete for any subcontracts entered into pursuant to this contract.

**UPGRADE BOOSTER PUMPS AT UNIT WELL 20
CONTRACT NO. 7045**

IN WITNESS WHEREOF, the Contractor has hereunto set his/her hand and seal and the City has caused these presents to be sealed with its corporate seal and to be subscribed by its Mayor and City Clerk the day and year first above written.

Countersigned:

Maria Bures 6-27-13
Witness Date
Maria Bures 6-27-13
Witness Date

MONONA PLUMBING & FIRE PROTECTION, INC.

Company Name

[Signature] 6/27/13
President Date
[Signature] 6/27/13
Secretary Date

CITY OF MADISON, WISCONSIN

Provisions have been made to pay the liability that will accrue under this contract.

Approved as to form:

[Signature]
Finance Director

[Signature]
City Attorney

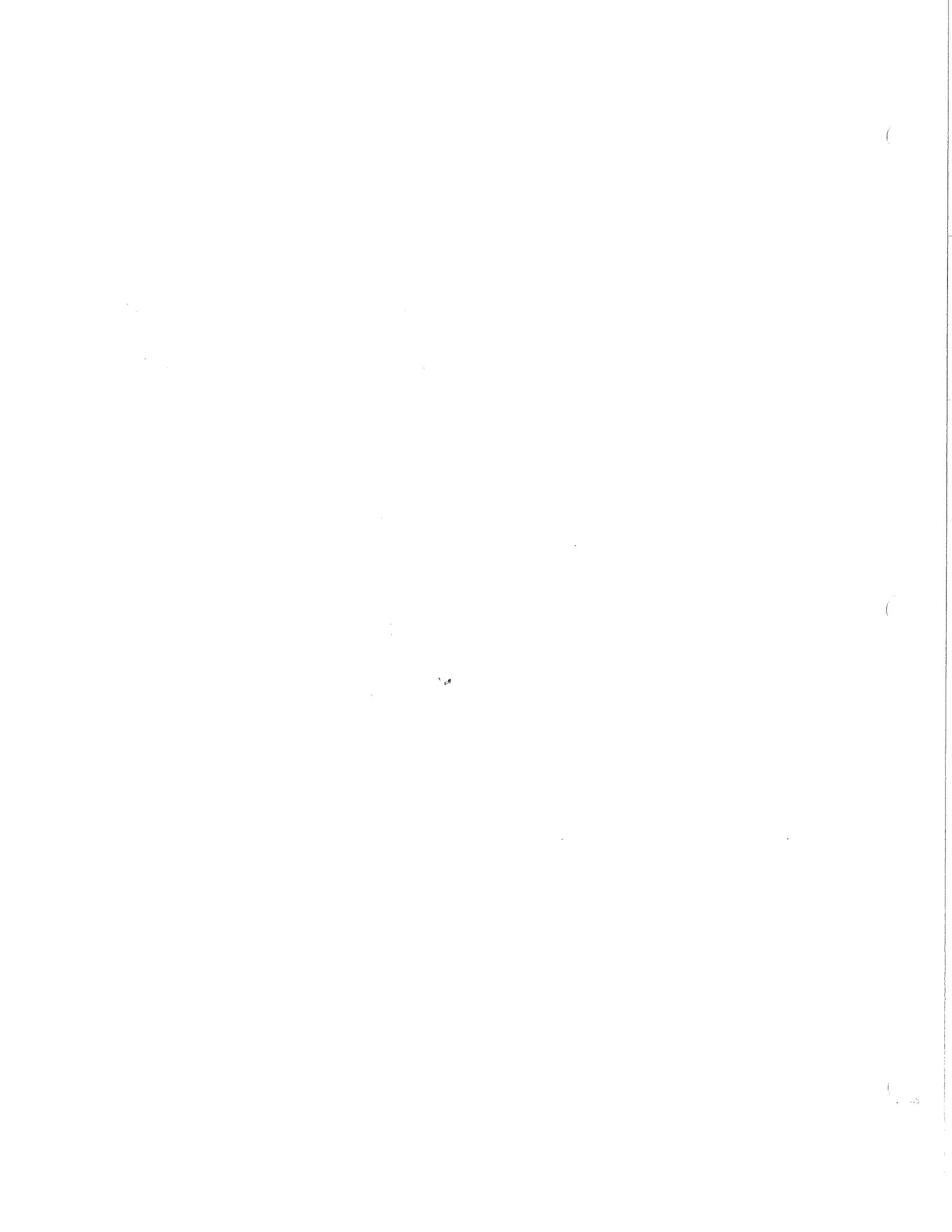
Signed this 18th day of _____

[Signature] 2013
Mayor Date

[Signature]
Witness

[Signature]
Witness

[Signature] 7-3-2013
City Clerk Date



SECTION I: PAYMENT AND PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, that we MONONA PLUMBING & FIRE PROTECTION, INC. as principal, and Fidelity & Deposit Company of Maryland Company of Maryland as surety, are held and firmly bound unto the City of Madison, Wisconsin, in the sum of TWO HUNDRED SEVENTY-FOUR THOUSAND NINE HUNDRED TWENTY(\$274,920.00) Dollars, lawful money of the United States, for the payment of which sum to the City of Madison, we hereby bind ourselves and our respective executors and administrators firmly by these presents.

The condition of this Bond is such that if the above bounden shall on his/her part fully and faithfully perform all of the terms of the Contract entered into between him/herself and the City of Madison for the construction of:

**UPGRADE BOOSTER PUMPS AT UNIT WELL 20
CONTRACT NO. 7045**

in Madison, Wisconsin, and shall pay all claims for labor performed and material furnished in the prosecution of said work, and save the City harmless from all claims for damages because of negligence in the prosecution of said work, and shall save harmless the said City from all claims for compensation (under Chapter 102, Wisconsin Statutes) of employees and employees of subcontractor, then this Bond is to be void, otherwise of full force, virtue and effect.

Signed and sealed this 20 day of June 2013

Countersigned:

Mari Bures

Witness

BW

Secretary

MONONA PLUMBING & FIRE PROTECTION, INC.

Company Name (Principal)

BW

President

Seal

Approved as to form:

Keith P. My
City Attorney

Fidelity & Deposit Company of Maryland

Surety

Seal

Salary Employee

Commission

By

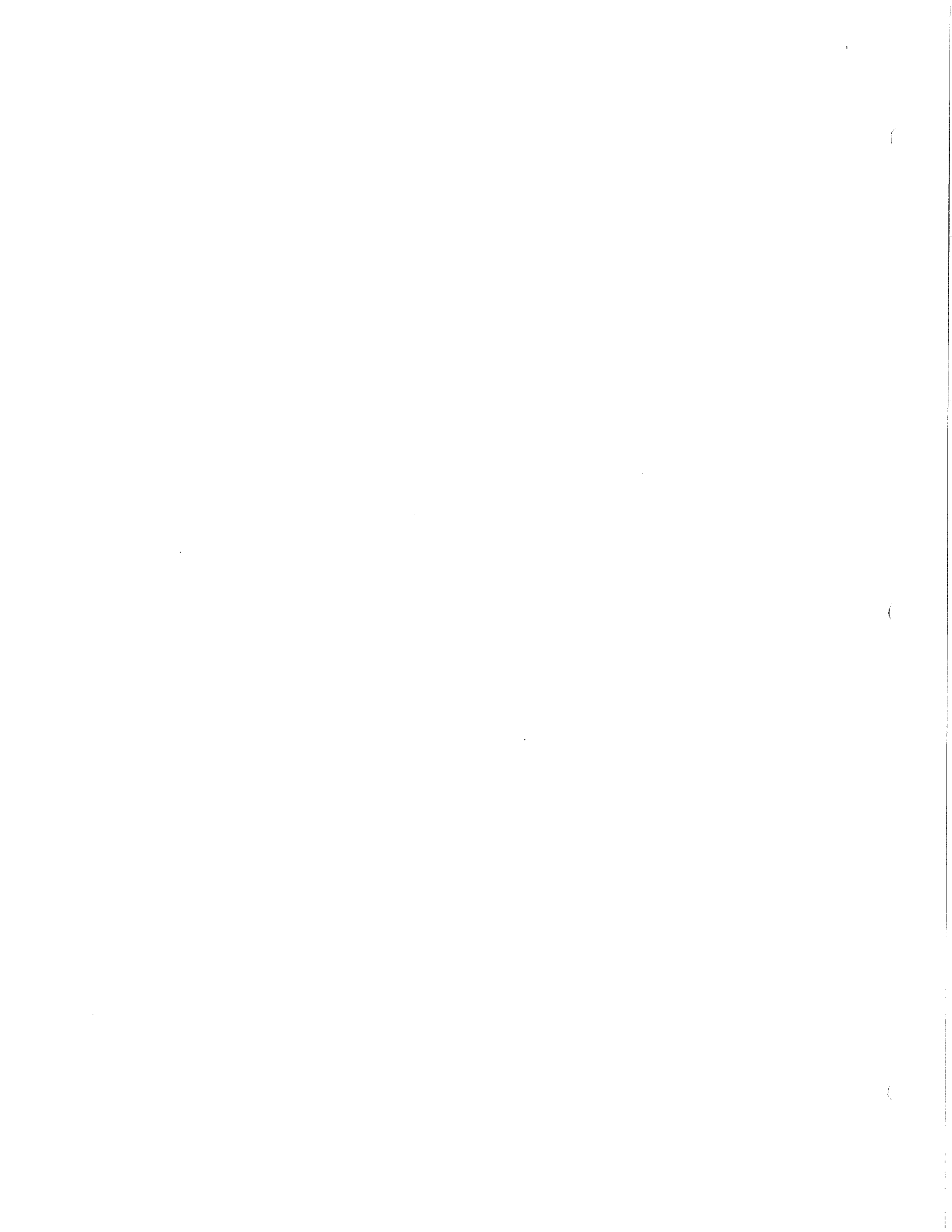
Kelsey Jacobson
Attorney-in-Fact Kelsey Jacobson

This certifies that I have been duly licensed as an agent for the above company in Wisconsin under License No. 2564601 for the year 2013, and appointed as attorney-in-fact with authority to execute this payment and performance bond which power of attorney has not been revoked.

6/20/13

Date

Kelsey Jacobson, Hausmann-Johnson Insurance
Agent



**Power of Attorney
FIDELITY AND DEPOSIT COMPANY OF MARYLAND**

KNOW ALL MEN BY THESE PRESENTS: That the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, a corporation of the State of Maryland, by DAVID S. HEWETT, Vice President, and GREGORY E. MURRAY, Assistant Secretary, in pursuance of authority granted by Article VI, Section 2, of the By-Laws of said Company, which are set forth on the reverse side hereof and are hereby certified to be in full force and effect on the date hereof, does hereby nominate, constitute and appoint **Judith A. WALKER, Sheila M. DICKEY, Steven L. SQUIRES, Jeffrey P. HAUSMANN, Timothy HAUSMANN, Patrick A. MCKENNA, Brooke L. PARKER and Kelsey JACOBSON, all of Madison, Wisconsin, EACH** its true and lawful agent and Attorney-in-Fact to make, execute, seal and deliver, for, and on its behalf as surety, and as its act and deed: **any and all bonds and undertakings**, and the execution of such bonds or undertakings in pursuance of these presents, shall be as binding upon said Company, as fully and amply, to all intents and purposes, as if they had been duly executed and acknowledged by the regularly elected officers of the Company at its office in Baltimore, Md., in their own proper persons. This power of attorney revokes that issued on behalf of Judith A. WALKER, Sheila M. DICKEY, Steven L. SQUIRES, Jeffrey P. HAUSMANN, Timothy HAUSMANN, Patrick A. MCKENNA, Brooke L. PARKER, dated March 26, 2010.

The said Assistant Secretary does hereby certify that the extract set forth on the reverse side hereof is a true copy of Article VI, Section 2, of the By-Laws of said Company, and is now in force.

IN WITNESS WHEREOF, the said Vice-President and Assistant Secretary have hereunto subscribed their names and affixed the Corporate Seal of the said FIDELITY AND DEPOSIT COMPANY OF MARYLAND, this 20th day of October, A.D. 2010.

ATTEST:

FIDELITY AND DEPOSIT COMPANY OF MARYLAND



Gregory E. Murray

By: *David S. Hewett*

Gregory E. Murray Assistant Secretary

David S. Hewett

David S. Hewett Vice President

State of Maryland }
City of Baltimore } ss:

On this 20th day of October, A.D. 2010, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, came DAVID S. HEWETT, Vice President, and GREGORY E. MURRAY, Assistant Secretary of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, to me personally known to be the individuals and officers described in and who executed the preceding instrument, and they each acknowledged the execution of the same, and being by me duly sworn, severally and each for himself deposed and saith, that they are the said officers of the Company aforesaid, and that the seal affixed to the preceding instrument is the Corporate Seal of said Company, and that the said Corporate Seal and their signatures as such officers were duly affixed and subscribed to the said instrument by the authority and direction of the said Corporation.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above written.



Maria D. Adamski

Maria D. Adamski

Maria D. Adamski Notary Public

My Commission Expires: July 8, 2015

EXTRACT FROM BY-LAWS OF FIDELITY AND DEPOSIT COMPANY OF MARYLAND

“Article VI, Section 2. The Chairman of the Board, or the President, or any Executive Vice-President, or any of the Senior Vice-Presidents or Vice-Presidents specially authorized so to do by the Board of Directors or by the Executive Committee, shall have power, by and with the concurrence of the Secretary or any one of the Assistant Secretaries, to appoint Resident Vice-Presidents, Assistant Vice-Presidents and Attorneys-in-Fact as the business of the Company may require, or to authorize any person or persons to execute on behalf of the Company any bonds, undertakings, recognizances, stipulations, policies, contracts, agreements, deeds, and releases and assignments of judgements, decrees, mortgages and instruments in the nature of mortgages,...and to affix the seal of the Company thereto.”

CERTIFICATE

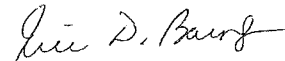
I, the undersigned, Assistant Secretary of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND, do hereby certify that the foregoing Power of Attorney is still in full force and effect on the date of this certificate; and I do further certify that the Vice-President who executed the said Power of Attorney was one of the additional Vice-Presidents specially authorized by the Board of Directors to appoint any Attorney-in-Fact as provided in Article VI, Section 2, of the By-Laws of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND.

This Power of Attorney and Certificate may be signed by facsimile under and by authority of the following resolution of the Board of Directors of the FIDELITY AND DEPOSIT COMPANY OF MARYLAND at a meeting duly called and held on the 10th day of May, 1990.

RESOLVED: "That the facsimile or mechanically reproduced seal of the company and facsimile or mechanically reproduced signature of any Vice-President, Secretary, or Assistant Secretary of the Company, whether made heretofore or hereafter, wherever appearing upon a certified copy of any power of attorney issued by the Company, shall be valid and binding upon the Company with the same force and effect as though manually affixed."

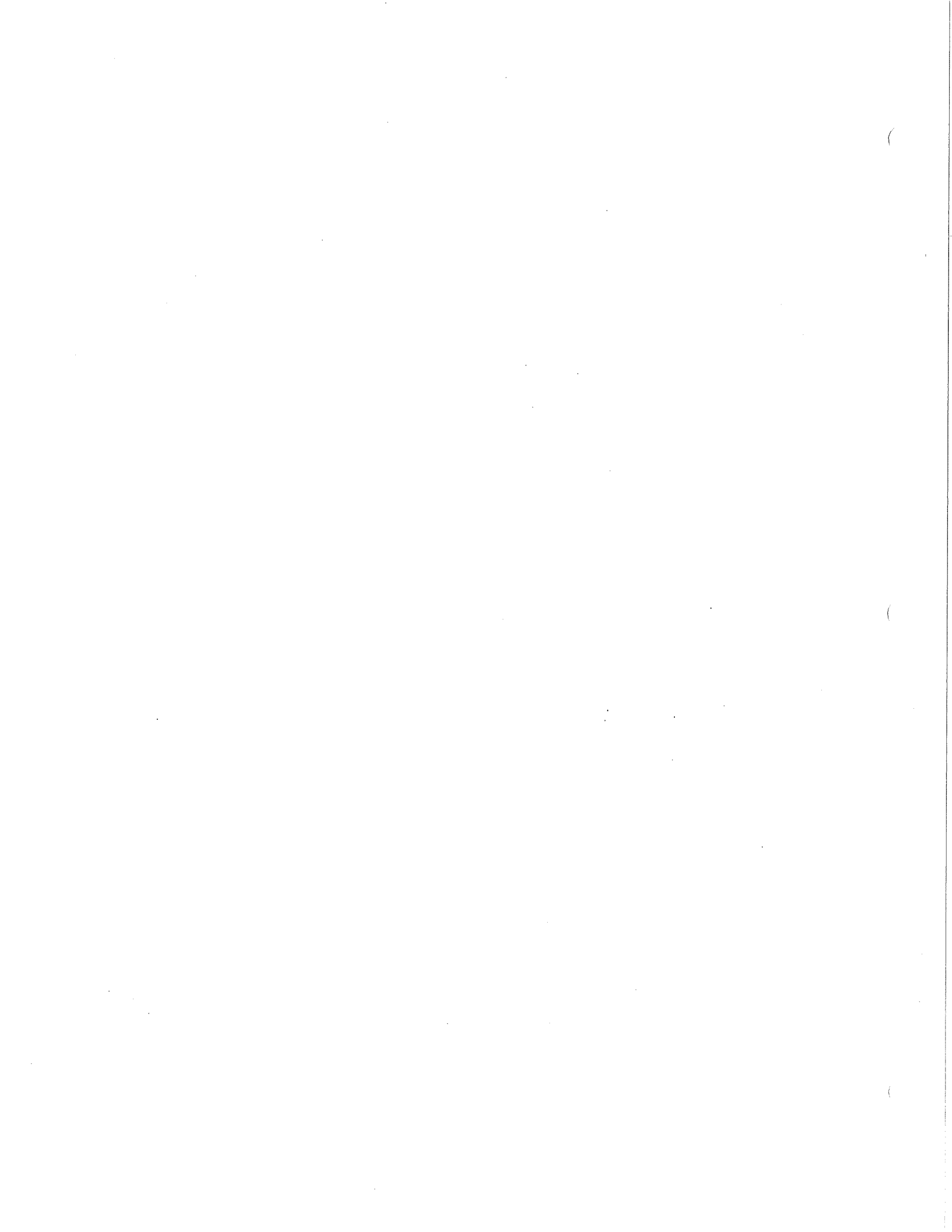
IN TESTIMONY WHEREOF, I have hereunto subscribed my name and affixed the corporate seal of the said Company,

this 20 day of JUNE, 2013.



Assistant Secretary

SECTION J: PREVAILING WAGE RATES



PREVAILING WAGE RATE DETERMINATION

Issued by the State of Wisconsin
Department of Workforce Development
Pursuant to s. 66.0903, Wis. Stats.
Issued On: 01/10/2013
Amended On: 02/18/2013

DETERMINATION NUMBER: 201300080

EXPIRATION DATE: Prime Contracts MUST Be Awarded or Negotiated On Or Before 12/31/2013. If NOT, You MUST Reapply.

PROJECT NAME: ALL PUBLIC WORKS PROJECTS UNDER SEC 66.0903, STATS - CITY OF MADISON

PROJECT LOCATION: MADISON CITY, DANE COUNTY, WI

CONTRACTING AGENCY: CITY OF MADISON-ENGINEERING

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

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

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

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

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

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

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

s. 66.0903 (11) LIABILITY AND PENALTIES.

- (a) 1. Any contractor, subcontractor, or contractor's or subcontractor's agent who fails to pay the prevailing wage rate determined by the department under sub. (3) or who pays less than 1.5 times the hourly basic rate of pay for all hours worked in excess of the prevailing hours of labor is liable to any affected employee in the amount of his or her unpaid wages or his or her unpaid overtime compensation and in an additional amount as liquidated damages as provided under subd. 2., 3., whichever is applicable.
2. If the department determines upon inspection under sub. (10) (b) or (c) that a contractor, subcontractor, or contractor's or subcontractor's agent has failed to pay the prevailing wage rate determined by the department under sub. (3) or has paid less than 1.5 times the hourly basic rate of pay for all hours worked in excess of the prevailing hours of labor, the department shall order the contractor to pay to any affected employee the amount of his or her unpaid wages or his or her unpaid overtime compensation and an additional amount equal to 100 percent of the amount of those unpaid wages or that unpaid overtime compensation as liquidated damages within a period specified by the department in the order.
3. In addition to or in lieu of recovering the liability specified in subd. 1. as provided in subd. 2., any employee for and in behalf of that employee and other employees similarly situated may commence an action to recover that liability in any court of competent jurisdiction. If the court finds that a contractor, subcontractor, or contractor's or subcontractor's agent has failed to pay the prevailing wage rate determined by the department under sub. (3) or has paid less than 1.5 times the hourly basic rate of pay for all hours worked in excess of the prevailing hours of labor, the court shall order the contractor, subcontractor, or agent to pay to any affected employee the amount of his or her unpaid wages or his or her unpaid overtime compensation and an additional amount equal to 100 percent of the amount of those unpaid wages or that unpaid overtime compensation as liquidated damages.
5. No employee may be a party plaintiff to an action under subd. 3. unless the employee consents in writing to become a party and the consent is filed in the court in which the action is brought. Notwithstanding s. 814.04 (1), the court shall, in addition to any judgment awarded to the plaintiff, allow reasonable attorney fees and costs to be paid by the defendant.

BUILDING OR HEAVY CONSTRUCTION

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

SKILLED TRADES

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

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

Fringe Benefits Must Be Paid On All Hours Worked

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

TRUCK DRIVERS

Fringe Benefits Must Be Paid On All Hours Worked

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

LABORERS

Fringe Benefits Must Be Paid On All Hours Worked

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

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

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

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

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

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

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

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

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

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

SKILLED TRADES

Fringe Benefits Must Be Paid On All Hours Worked

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

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

TRUCK DRIVERS

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

LABORERS

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

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

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

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

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

AIRPORT PAVEMENT OR STATE HIGHWAY CONSTRUCTION

Includes all airport projects (excluding buildings) and all projects awarded by the Wisconsin Department of Transportation (excluding buildings).

SKILLED TRADES

CODE	TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
		\$	\$	\$
103	Bricklayer, Blocklayer or Stonemason	35.58	19.20	54.78
105	Carpenter	30.16	15.31	45.47
107	Cement Finisher Future Increase(s): Add \$1.87 on 6/1/13; Add \$1.87 on 6/1/14; Add \$1.87 on 6/1/15; Add \$1.75 on 6/1/16. Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.40/hr when the Wisconsin Department of Transportation or responsible governing agency requires that work be performed at night under artificial illumination with traffic control and the work is completed after sunset and before sunrise.	32.09	16.13	48.22
109	Electrician Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	32.94	18.80	51.74
111	Fence Erector	28.00	4.50	32.50
116	Ironworker	30.90	19.11	50.01
118	Line Constructor (Electrical)	31.29	15.34	46.63
124	Painter	26.65	13.10	39.75
125	Pavement Marking Operator	29.22	16.71	45.93
126	Piledriver	30.66	15.31	45.97
133	Rofer or Waterproofer	30.40	2.23	32.63
137	Teledata Technician or Installer	21.26	11.75	33.01
143	Tuckpointer, Caulker or Cleaner	32.01	16.85	48.86
144	Underwater Diver (Except on Great Lakes)	37.45	19.45	56.90
150	Heavy Equipment Operator - ELECTRICAL LINE CONSTRUCTION ONLY	29.64	17.00	46.64
151	Light Equipment Operator -ELECTRICAL LINE CONSTRUCTION ONLY	35.50	15.09	50.59

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
152	Heavy Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	25.94	13.57	39.51
153	Light Truck Driver - ELECTRICAL LINE CONSTRUCTION ONLY	24.08	12.96	37.04
154	Groundman - ELECTRICAL LINE CONSTRUCTION ONLY	21.75	11.90	33.65

TRUCK DRIVERS

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
201	Single Axle or Two Axle	33.22	18.90	52.12
203	Three or More Axle Future Increase(s): Add \$1.85/hr on 6/1/2013. Premium Increase(s): DOT PREMIUM: Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day.	23.31	17.13	40.44
204	Articulated, Euclid, Dumptor, Off Road Material Hauler Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14. Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm .	27.77	19.90	47.67
205	Pavement Marking Vehicle	23.84	14.94	38.78
206	Shadow or Pilot Vehicle	33.22	18.90	52.12
207	Truck Mechanic	22.50	16.19	38.69

LABORERS

Fringe Benefits Must Be Paid On All Hours Worked

<u>CODE</u>	<u>TRADE OR OCCUPATION</u>	<u>HOURLY BASIC RATE OF PAY</u> \$	<u>HOURLY FRINGE BENEFITS</u> \$	<u>TOTAL</u> \$
301	General Laborer Future Increase(s): Add \$1.70/hr on 6/1/2013; Add \$1.60/hr on 6/1/2014. Premium Increase(s): 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).	28.35	13.90	42.25
302	Asbestos Abatement Worker	18.00	0.00	18.00
303	Landscaper Future Increase(s): Add \$1.70/hr on 6/1/13; Add \$1.60/hr on 6/1/14. Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr 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).	28.35	13.90	42.25
304	Flagperson or Traffic Control Person Future Increase(s): Add \$1.70/hr on 6/1/2013; Add \$1.60/hr on 6/1/2014. Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr 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.	24.70	13.90	38.60
311	Fiber Optic Laborer (Outside, Other Than Concrete Encased)	17.81	12.22	30.03
314	Railroad Track Laborer	23.41	6.91	30.32

**HEAVY EQUIPMENT OPERATORS
AIRPORT PAVEMENT OR STATE HIGHWAY CONSTRUCTION**

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	<u>TOTAL</u>
<u>CODE</u>	<u>TRADE OR OCCUPATION</u>	\$	\$	\$
531	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). Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14. Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm .	35.22	19.90	55.12
532	Backhoe (Track Type) Having a Mfgr.'s Rated Capacity of 130,000 Lbs. or Over; Caisson Rig; Crane, Tower Crane, Portable Tower, Pedestal Tower or Derrick, With 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. Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14. Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm .	34.72	19.90	54.62

Fringe Benefits Must Be Paid On All Hours Worked

<u>CODE</u>	<u>TRADE OR OCCUPATION</u>	<u>HOURLY BASIC RATE OF PAY</u> \$	<u>HOURLY FRINGE BENEFITS</u> \$	<u>TOTAL</u> \$
533	<p>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 Mfgr.'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); 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.</p> <p>Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14.</p> <p>Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtml.</p>	34.22	19.90	54.12

534	<p>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.</p> <p>Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14.</p> <p>Premium Increase(s):</p>	33.96	19.90	53.86
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Fringe Benefits Must Be Paid On All Hours Worked

CODE	TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY \$	HOURLY FRINGE BENEFITS \$	TOTAL \$
	<p>DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm.</p>			
535	<p>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.</p> <p>Future Increase(s): Add \$2/hr on 6/1/13; Add \$1.75/hr on 6/1/14.</p> <p>Premium Increase(s): DOT PREMIUMS: 1) Pay two times the hourly basic rate on Sunday, New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day & Christmas Day. 2) Add \$1.25/hr night work premium. See DOT's website for details about the applicability of this night work premium at: http://roadwaystandards.dot.wi.gov/hcci/labor-wages-eeo/index.shtm.</p>	33.67	19.90	53.57
536	Fiber Optic Cable Equipment.	25.74	15.85	41.59
537	Work Performed on the Great Lakes Including Diver; Wet Tender or Hydraulic Dredge Engineer.	37.45	19.45	56.90
538	Work Performed on the Great Lakes Including 70 Ton & Over Tug Operator; Assistant Hydraulic Dredge Engineer; Crane or Backhoe Operator; Hydraulic Dredge Leverman or Diver's Tender; Mechanic or Welder.	37.45	19.45	56.90
539	Work Performed on the Great Lakes Including Deck Equipment Operator or Machineryman (Maintains Cranes Over 50 Tons or Backhoes 115,000 Lbs. or More); Tug, Launch or Loader, Dozer or Like Equipment When Operated on a Barge, Breakwater Wall, Slip, Dock or Scow, Deck Machinery.	27.75	19.15	46.90
540	Work Performed on the Great Lakes Including Deck Equipment Operator, Machineryman or Fireman (Operates 4 Units or More or Maintains Cranes 50 Tons or Under or Backhoes 115,000 Lbs. or Under); Deck Hand, Deck Engineer or Assistant Tug Operator; Off Road Trucks-Great Lakes ONLY.	27.75	19.15	46.90

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

SKILLED TRADES

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

TRUCK DRIVERS

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

LABORERS

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

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

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

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

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

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

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

Future Increase(s):

Add \$1/hr on 6/2/2013.

Fringe Benefits Must Be Paid On All Hours Worked

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

RESIDENTIAL OR AGRICULTURAL CONSTRUCTION

Includes single family houses or apartment buildings of no more than four (4) stories in height and all buildings, structures or facilities that are primarily used for agricultural or farming purposes, excluding commercial buildings. For classification purposes, the exterior height of a residential building, in terms of stories, is the primary consideration. Incidental items such as site work, driveways, parking lots, private sidewalks, private septic systems or sewer and water laterals connected to a public system and swimming pools are included within this definition. Residential buildings of five (5) stories and above are NOT included within this definition.

SKILLED TRADES

Fringe Benefits Must Be Paid On All Hours Worked

<u>CODE</u>	<u>TRADE OR OCCUPATION</u>	<u>HOURLY BASIC RATE OF PAY</u> \$	<u>HOURLY FRINGE BENEFITS</u> \$	<u>TOTAL</u> \$
101	Acoustic Ceiling Tile Installer	19.50	11.10	30.60
102	Boilermaker	31.09	24.52	55.61
103	Bricklayer, Blocklayer or Stonemason	23.00	0.00	23.00
104	Cabinet Installer	16.25	3.22	19.47
105	Carpenter	30.16	1.36	31.52
106	Carpet Layer or Soft Floor Coverer	23.95	6.48	30.43
107	Cement Finisher	22.46	2.71	25.17
108	Drywall Taper or Finisher	15.50	0.00	15.50
109	Electrician	17.00	13.64	30.64
110	Elevator Constructor	44.94	23.84	68.78
111	Fence Erector	18.52	5.93	24.45
112	Fire Sprinkler Fitter	36.07	18.60	54.67
113	Glazier	37.13	12.32	49.45
114	Heat or Frost Insulator	35.00	0.00	35.00
115	Insulator (Batt or Blown)	18.50	13.98	32.48
116	Ironworker	30.90	19.11	50.01
117	Lather	30.16	1.36	31.52
119	Marble Finisher	16.50	2.38	18.88
120	Marble Mason	23.00	0.00	23.00
121	Metal Building Erector	16.52	1.82	18.34
123	Overhead Door Installer	17.00	0.00	17.00
124	Painter	23.00	11.27	34.27
125	Pavement Marking Operator	28.10	15.00	43.10

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
129	Plasterer	20.00	0.00	20.00
130	Plumber	38.90	0.00	38.90
132	Refrigeration Mechanic	33.00	1.79	34.79
133	Roofer or Waterproofor	17.50	3.73	21.23
134	Sheet Metal Worker	21.03	3.40	24.43
135	Steamfitter	41.20	16.28	57.48
137	Teledata Technician or Installer	19.23	1.46	20.69
138	Temperature Control Installer	21.00	0.00	21.00
139	Terrazzo Finisher	26.57	16.00	42.57
140	Terrazzo Mechanic	30.01	17.13	47.14
141	Tile Finisher	20.60	4.88	25.48
142	Tile Setter	19.00	0.00	19.00
143	Tuckpointer, Caulker or Cleaner	32.50	2.84	35.34
146	Well Driller or Pump Installer	19.00	7.30	26.30
147	Siding Installer	19.07	0.00	19.07

TRUCK DRIVERS

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
201	Single Axle or Two Axle	28.05	4.18	32.23
203	Three or More Axle	20.00	4.37	24.37
205	Pavement Marking Vehicle	20.85	11.02	31.87
207	Truck Mechanic	19.00	1.85	20.85

LABORERS

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked		HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
CODE	TRADE OR OCCUPATION	\$	\$	\$
301	General Laborer	19.80	7.22	27.02
302	Asbestos Abatement Worker	18.00	6.24	24.24
303	Landscaper	13.15	6.51	19.66

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked				
CODE	TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
		\$	\$	\$
311	Fiber Optic Laborer (Outside, Other Than Concrete Encased)	17.81	12.22	30.03
315	Final Construction Clean-Up Worker	15.00	0.00	15.00

**HEAVY EQUIPMENT OPERATORS
RESIDENTIAL OR AGRICULTURAL CONSTRUCTION**

Fringe Benefits Must Be Paid On <u>All</u> Hours Worked				
CODE	TRADE OR OCCUPATION	HOURLY BASIC RATE OF PAY	HOURLY FRINGE BENEFITS	TOTAL
		\$	\$	\$
557	Asphalt Heater, Planer & Scarifier; Asphalt Milling Machine; Asphalt Screed; Backhoe (Track Type); Backhoe (Mini, 15,000 Lbs. & Under); Bituminous (Asphalt) Plant & Paver, Screed; Boring Machine (Directional, Horizontal or Vertical); Bulldozer or Endloader; Concrete Breaker (Large, Auto, Vibratory/Sonic, Manual or Remote); Concrete 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; Crane, Shovel, Dragline, Clamshells; Forestry Equipment, Timberco, Tree Shear, Tub Grinder, Processor; Grader or Motor Patrol; Grout Pump; Hydro-Blaster (10,000 PSI or Over); Loading Machine (Conveyor); Manhoist; Material or Stack Hoist; Mechanic or Welder; Milling Machine; Roller (Over 5 Ton); Scraper (Self Propelled or Tractor Drawn) 5 cu yds or More Capacity; Shoulder Widener; Skid Rig; Stabilizing or Concrete Mixer (Self-Propelled or 14S or Over); 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); Winches & A-Frames.	31.89	18.20	50.09
558	Air Compressor (&/or 400 CFM or Over); Air, Electric or Hydraulic Jacking System; Backfiller; Belting, Burlap, Texturing Machine; Boiler (Temporary Heat); Broom or Sweeper; Compactor (Self-Propelled or Tractor Mounted, Towed & Light Equipment); Concrete Finishing Machine (Road Type); Farm or Industrial Type Tractor; Forklift; Generator (&/or 150 KW or Over); Heaters (Mechanical); High Pressure Utility Locating Machine (Daylighting Machine); Jeep Digger; Lift Slab Machine; Mulcher; Oiler; Post Hole Digger or Driver; Power Subgrader; Pump (3 Inch or Over) or Well Points; Robotic Tool Carrier (With or Without Attachments); Rock, Stone Breaker; Roller (Rubber Tire, 5 Tons or Under); Screed (Milling Machine); Self Propelled Chip Spreader; Shouldering Machine; Skid Steer Loader (With or Without Attachments); Stump Chipper; Telehandler; Vibratory Hammer or Extractor, Power Pack.	28.70	4.91	33.61

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