

# **CONTRACT DOCUMENTS**

FOR

## **N. 115<sup>TH</sup> STREET IMPROVEMENTS**

IN THE  
CITY OF WAUWATOSA, WISCONSIN

### **CONTRACT 23-07**

PROJECT 1023  
QuestCDN No. 8422682



April 17, 2023

Construction & Inspection  
Coordination:

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**CONTRACT 23-07**

PROJECT 1023  
QuestCDN No. 8422682

The plans and specifications for this project were prepared by the Engineering Services Division.

Date April 17, 2023

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William T. Wehrley  
City Engineer

The plans, specifications, form of contracts and other documents contained in and constituting the contract documents for this project were approved by the Board of Public Works of the City of Wauwatosa, at a meeting held April 17, 2023.

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Steven A. Braatz Jr., City Clerk  
Wauwatosa, Wisconsin

## **SECTION 100 – OFFICIAL NOTICE**

### **OFFICIAL NOTICE TO CONTRACTORS** **ADVERTISEMENT FOR BIDS**

The City of Wauwatosa will receive proposals for utility improvements until 11:01 A.M. Local Time, May 10, 2023, at which time all bids will be publicly opened and read virtually via use of the Zoom platform. Access at [zoom.us](https://zoom.us), Meeting ID 858 4894 1097.

#### **CONTRACT 23-07 N. 115<sup>TH</sup> STREET IMPROVEMENTS**

Under this proposal, the Contractor shall furnish all labor, materials, supplies, equipment, tools and other services necessary for storm sewer construction, sanitary sewer T-liners, sanitary manhole rehabilitation, water main spot repairs, asphalt repaving and reconstruction, asphalt pulverizing, grading, concrete curb and gutter spot replacement, ADA curb ramps, asphalt pavement, concrete pavement spot replacement, pavement markings, street lighting, and work incidental thereto in portions of:

N. 115<sup>th</sup> St.

From: W. Underwood Pkwy.

To: W. Blue Mound Rd.

all in accordance with contract documents.

Interested parties may view and obtain digital copies of the contract documents, including plans and specifications, from Quest Construction Data Network. Access the QuestCDN website at [www.questcdn.com](http://www.questcdn.com). Input QuestCDN eBidDoc No. 8422682 on the website's Project Search page. No password is required. Contact QuestCDN.com at 952-233-1632 or [info@questcdn.com](mailto:info@questcdn.com) for assistance in downloading and working with the digital documents.

There is a nonrefundable charge of \$25.00 for the plans and contract documents. Plans are also available for viewing only at the Engineering office at City Hall, 7725 W. North Avenue, Wauwatosa, Wisconsin. Plans will be available on April 19, 2023.

The City will accept only online electronic bids through QuestCDN. To access the electronic bid form, download the project documents and click the online bidding button at the top of the advertisement.

All proposals must be submitted in electronic format together with a bid bond equal to five (5) percent of the bid payable to the City of Wauwatosa, Wisconsin, as a guarantee that if his bid is accepted, the successful bidder will execute and file the proper contract and bonds within ten (10) days after notification of award of the contract.

Failure on the part of the successful bidder to execute his contract and *performance and labor & material payment* bonds within ten (10) days from the date of notice of the award of contract will be considered as just cause for the annulment of the award and

the forfeiture of the proposal guarantee to the City not as a penalty but in payment to the City as liquidated damages as a result of such failure.

No bid shall be withdrawn after the opening of bids for a period of sixty (60) days after the scheduled time of closing of bids.

The letting of the work described herein is subject to the provisions of Section 66.09, Wisconsin Statutes, requiring the bidder to furnish proof of responsibility. Bidder prequalification is required on forms furnished by the City of Wauwatosa and submitted to the City Engineer. Prequalification forms that are submitted after 5 days preceding the contract letting date may be cause for the rejecting of bids.

#### **TIME OF SUBSTANTIAL COMPLETION**

The substantial completion date for Contract 23-07 N. 115<sup>TH</sup> STREET IMPROVEMENTS shall be October 13, 2023. See Section 600 for additional completion requirements.

There will be no other extension of time and no extenuating circumstances, except perhaps an industry strike, or the inability of the City to receive plan and specification approval.

If the contractor does not complete the work on or before the date set forth above for CONTRACT 23-07 N. 115<sup>TH</sup> STREET IMPROVEMENTS or within the extra time allowed under a City Engineer granted time extension, the City will assess liquidated damages. The City will deduct one thousand five hundred seventy dollars (\$1,570.00) for every calendar day that the work remains uncompleted from payments due the contractor.

The Contractor will also be charged for each and every day inspection is required after the time of completion has expired. This charge will be based on the actual costs of inspection, construction supervision, clerical and administrative costs, traffic control and overhead charges.

A required "Affidavit of Compliance" is included in Section 300 and must be submitted with the bid.

The right to reject or accept any or all bids and the right to waive any informality in bidding is reserved to the City of Wauwatosa, Wisconsin.

Dated at Wauwatosa, Wisconsin April 17, 2023

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Steven A. Braatz Jr., City Clerk

City of Wauwatosa, Wisconsin



## **SECTION 200 – INSTRUCTIONS TO BIDDERS**

200.01 - DESCRIPTION OF WORK The work on this contract consists of the following:

### **CONTRACT 23-07 N. 115<sup>TH</sup> STREET IMPROVEMENTS**

Under this proposal, the Contractor shall furnish all labor, materials, supplies, equipment, tools and other services necessary for storm sewer construction, sanitary sewer T-liners, sanitary manhole rehabilitation, water main spot repairs, asphalt repaving and reconstruction, asphalt pulverizing, grading, concrete curb and gutter spot replacement, ADA curb ramps, asphalt pavement, concrete pavement spot replacement, pavement markings, street lighting, and work incidental thereto. The contractor will perform this work at various locations in areas within the City of Wauwatosa, all in accordance with contract documents.

200.02 - RETURN OF PROPOSAL GUARANTY The bid deposit(s) of all depositors will be returned after the bids have been accepted by the Common Council and the vouchers for the return of the deposit(s) approved by the Common Council.

200.03 - TIME OF SUBSTANTIAL COMPLETION The substantial completion date for Contract 23-07 N. 115<sup>TH</sup> STREET IMPROVEMENTS shall be October 13, 2023. See Section 600 for additional completion requirements.

There will be no other extension of time and no extenuating circumstances, except perhaps an industry strike, or the inability of the City to receive plan and specification approval.

If the contractor does not complete the work on or before the date set forth above for CONTRACT 23-07 N. 115<sup>TH</sup> STREET IMPROVEMENTS or within the extra time allowed under a City Engineer granted time extension, the City will assess liquidated damages. The City will deduct one thousand five hundred seventy dollars (\$1,570.00) for every calendar day that the work remains uncompleted from payments due the contractor.

200.04 - BOND REQUIREMENTS In addition to the standard full penalty for nonperformance of Contract, the Contractor's attention is directed to Section 504.16 that requires a second performance bond guaranteeing labor and material payments.

200.05 - EXAMINATION OF SITE AND CONTRACT DOCUMENTS The bidder is required to examine carefully the site of the work, the proposal, plans specifications, general conditions, official notice to contractors, contract and bond, all as herein contained and known as the contract documents for the work contemplated; it will be assumed that the bidder has investigated and is satisfied as to the requirements of the contract documents. It is mutually agreed that the submission of a proposal shall be considered as conclusive evidence that the bidder has made such examination and is satisfied as to all the conditions and contingencies.

No pleas of ignorance of conditions that exist or that may hereafter exist, or of conditions or difficulties that may be encountered in the execution of the work under this Contract, as a result of failure to make the necessary examinations and investigations will be accepted as an excuse for any failure or omission on the part of the Contractor to fulfill, in every detail, all of the requirements of the contract documents, or will be accepted as a basis for any claims whatsoever for extra compensation or for an extension of time.

200.06 - INTERPRETATION OF CONTRACT DOCUMENTS AND ADDENDA Should any question arise concerning the true meaning of any part of the contract documents, the bidder may submit to the City Engineer a written request for an interpretation thereof. The interpretation of the question so requested will be made as an addendum and either mailed or delivered to all bidders who receive contract documents.

Addenda: Bidders shall acknowledge receipt and incorporation of all addenda at the appropriate location provided in the proposal. Any addenda issued during the time of bidding shall be included with the bid, and in closing a contract they will become a part thereof.

200.07 - PREPARATION OF PROPOSALS The bidder can ONLY submit his proposal through the QuestCDN electronic bidding format. A nominal fee will be charged to the Bidder for an electronic submission of a proposal through QuestCDN.

Wisconsin Statute 77.54(9m) allows a sales and use tax exemption for certain building materials sold to construction contractors for incorporation into public works projects. To claim the exemption, contractors must prepare Wisconsin Form S-211, Sales and Use Tax Exemption Certificate and provide the form to their supplier in compliance with WI 77.54(9m) when purchasing supplies covered by this statute. All other materials, supplies, and equipment purchased by a contractor, sub contractor, or builder for the construction of the work specified under this contract is subject to all applicable sales tax. Proposals are to include all applicable sales tax.

#### 200.08 - REQUIREMENTS FOR SIGNING BIDS

- a) Bids, which are not signed by individuals making them, shall have attached thereto a power of attorney evidencing authority to sign the bid in the name of the person for whom it is signed.
- b) Bids, which are signed for a partnership, shall be signed by all of the partners or by an attorney-in-fact. If signed by an attorney-in-fact there shall be attached to the bid a power-of-attorney evidencing authority to sign the bid, executed by the partners.



- c) Bids, which are signed for a corporation, shall have the corporate name thereof and the signature of the President or other authorized officers of the Corporation, manually written below the corporate name following the word "By \_\_\_\_\_."

**200.09 - INTERPRETATION OF ESTIMATES** The estimated quantities of the work, which are the results of calculations as accurate as possible in advance, shall be used as a basis for determining the lowest bidder. After the contract is awarded, the quantity of work listed under any item, or all items, may be increased or decreased a reasonable amount at the discretion of the City Engineer without in any way invalidating the bid price. The quantities on which payment will be made to the contractor will be determined by the City Engineer who shall measure the work actually performed by the contractor as specified in the contract.

Bidders must determine for themselves the quantities of work that will be required, by such means as they may prefer, and shall assume all risks as to variations in the quantities of the different classes of work actually performed under the contract. Bidders shall not at any time after the submission of their proposal dispute or complain of the aforesaid schedule of quantities or assert that there was any misunderstanding in regard to the amount or character of the work to be done, and shall not make any claim for damages or loss of profits because of a difference between the quantities of work assumed for comparison of bids and the quantities of work actually performed.

**200.10 - WHEN AWARD EFFECTUAL** The contract shall be deemed as having been awarded when formal notice of award shall have been duly served upon the intended awardee (i.e., the bidder to whom the City contemplates awarding the contract) by some officer or agent of the City duly authorized to give such notice.

**200.11 - REQUIRED NUMBER OF EXECUTED CONTRACTS** The successful bidder will be required, after the award of the contract, to furnish four (4) counterparts of the contract and bond, no later than 10 days after notification of the award of the contract.

**200.12 - WITHDRAWAL OF BIDS** Any bidder may withdraw his bid at any time prior to the scheduled time for the receipt of bids.

**200.13 - DELIVERY OF PROPOSALS** - The bidder can ONLY submit his proposal through the QuestCDN electronic bidding format. A nominal fee will be charged to the Bidder for an electronic submission of a proposal through QuestCDN.

Please note that returning the entire Project Manual is not required; the relevant contract forms, proposals, etc. shall be considered sufficiently complete when submitted through the QuestCDN on-line bidding process.

**200.14 - REJECTION OF PROPOSALS** Proposals may be rejected, if they show any alterations of form, additions not called for, conditional or alternate bids unless called for, incomplete bids, or irregularities of any kind. Proposals in which the unit prices are obviously unbalanced may be rejected.

200.15 - PROPOSAL GUARANTY No proposal will be considered unless the bid is accompanied by either of the following proposal guarantees:

a) Bid Bond The bidder may accompany his proposal with a bid bond equal to at least five percent (5%) but not more than ten percent (10%) of his bid, made payable to the City of Wauwatosa, Wisconsin, as a guarantee that if his bid is accepted he will execute and file the proper contract and bond within ten (10) days after notification of the award of the contract.

b) Certified Check The bidder may accompany his proposal with a certified check for at least five percent (5%) of the total amount of his bid, made payable to the City of Wauwatosa, Wisconsin, as a guaranty that if his bid is accepted he will execute and file the proper contract and bond within ten (10) days after notification of the award of the contract.

Failure on the part of the successful bidder to execute his contract and performance bond within ten (10) days from the date of notice of the award of contract will be considered as just cause for the annulment of the award and the forfeiture of the proposal guarantee to the City not as a penalty but in payment to the City as liquidated damages as a result of such failure.

200.16 - CONSIDERATION OF PROPOSALS The City reserves the right to reject any or all proposals, to waive technicalities, and to advertise for new proposals, or to proceed to do the work otherwise.

Before any contract is awarded, the bidder may be required to furnish a complete statement of the origin, composition and manufacture of any or all materials to be used in the construction of the work, together with samples, which may be subjected to tests provided for in these specifications to determine their quality and fitness for the work.

200.17 – PAYMENT Payment shall be per Section 501.10 by the form specified.

**The City will not accept or respond to payment application requests from subcontractors.**

No interest will be paid by the Owner for any delay in making any payment unless the Contractor makes written demand of the Owner for payment of interest for any such delay. In no event, however, will any interest be payable for the 10 day period following the 15th of the calendar month. Interest will be payable at the rate of 5% annually and Wisconsin Statutes Section 66.01335 does not apply.

200.18 - RESPONSIBILITY OF THE CONTRACTOR The Contractor, under this contract, shall protect the City against any damage to the equipment and material being used or installed. Any damage occurring because of failure on the part of the

equipment, employees, or supervisors, shall be repaired or replaced by the contractor without cost to the City.

200.19 - PREQUALIFICATIONS OF BIDDERS All bidders are to furnish proof of responsibility by completing the prequalification form furnished by the City of Wauwatosa. This form is to be obtained from the City Engineer's office and is to be returned to the City Engineer's office in the City Hall of Wauwatosa, Wisconsin, not less than five (5) days prior to the time set for opening of bids as stated in the Official Notice.

200.20 - SUBSTANCE ABUSE PREVENTION PROGRAM

By signing this Bid, the Bidder certifies to the City of Wauwatosa that it has, or will have prior to Contract award, a substance abuse prevention program which complies with State of Wisconsin Act 181 (Chapter 103.503 of the State Statutes) and Section 505.09 - SUBSTANCE ABUSE PREVENTION PROGRAM of these documents. The program must cover all union and non-union employees who work on the Owner's construction sites. Failure to implement such a program prior to award shall result in the Bidder being held to be non-responsible. Following award of the Contract if the Contractor breaches the District Policy by failing to have or to effectively implement the policy, the Owner shall consider this a breach of the Contract by the Contractor and may terminate the Contract. This requirement shall be applicable to all subcontractors with subcontracts in excess of one percent (1%) of the bid.

## **SECTION 300 - PROPOSAL**

### **CONTRACT 23-07 N. 115<sup>TH</sup> STREET IMPROVEMENTS**

Bids to be received until 11:01 A.M. Local Time, May 10, 2023.

TO: CITY OF WAUWATOSA  
WAUWATOSA, WISCONSIN

The undersigned, having familiarized oneself with the local conditions affecting the work and with the contract documents including advertisement for bids, instruction to bidders, general conditions, the form of proposal, the form of contract, form of bond, plan, specifications on file in the office of the City Clerk of the City of Wauwatosa, Wisconsin, hereby proposes to perform everything required to be performed and to provide and furnish all labor, materials, supplies, equipment, tools and other services necessary for storm sewer construction, sanitary sewer T-liners, sanitary manhole rehabilitation, water main spot repairs, asphalt repaving and reconstruction, asphalt pulverizing, grading, concrete curb and gutter spot replacement, ADA curb ramps, asphalt pavement, concrete pavement spot replacement, pavement markings, street lighting, and work incidental thereto all in accordance with the plans and specifications as prepared by the City of Wauwatosa Engineering Services Division, Wauwatosa, Wisconsin, including all addenda issued hereto for the prices as listed below.

Addenda: The bidder hereby acknowledges that they have received Addenda Nos. \_\_, \_\_, \_\_, (Bidder shall insert No. of each addendum received) and agrees that all addenda are hereby made part of the Contract Documents, and Bidder further agrees that their bid(s) includes all impact resulting from said addenda.

### **Contract 23-07 N. 115<sup>th</sup> St Improvements**

#### **DIVISION A - SANITARY**

LINE ITEM	ITEM CODE	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
A1	A2-18	TEE LINER	2	EA		
A2	A5-02	"PRO-RING" CHIMNEY REBUILD	5.5	VF		
A3	A5-03	REBUILD SANITARY MANHOLE	3	VF		
A4	A5-04	REPLACE FRAME AND COVER, EX SAN MH'S, CITY SUPPLIED	11	EA		

#### **TOTAL FOR DIVISION A (ITEMS 1-3)**

#### **DIVISION B - WATER MAIN**

LINE ITEM	ITEM CODE	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
B1	B3-06	ABANDON WATER VALVE VAULT	1	EA		
B2	B3-11	24" WATER MAIN BUTTERFLY VALVE	1	EA		

**TOTAL FOR DIVISION B (ITEMS 1-2)****DIVISION C - STORM SEWER**

LINE ITEM	ITEM CODE	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
C1	C1-123	12" CLASS V REINFORCED CONCRETE STORM SEWER	326.8	LF		
C2	C1-124	15" CLASS V REINFORCED CONCRETE STORM SEWER	33.9	LF		
C3	C1-50	18" CLASS IV REINFORCED CONCRETE STORM SEWER	27.8	LF		
C4	C1-51	21" CLASS IV REINFORCED CONCRETE STORM SEWER	236.0	LF		
C5	C1-31	24" CLASS III REINFORCED CONCRETE STORM SEWER	373.1	LF		
C6	C1-33	30" CLASS III REINFORCED CONCRETE STORM SEWER	724.0	LF		
C7	C1-34	36" CLASS III REINFORCED CONCRETE STORM SEWER	12.0	LF		
C8	C3-01	48" DIA. PRECAST STORM MANHOLE (6 LOC.)	33.9	VF		
C9	C3-02	60" DIA. PRECAST STORM MANHOLE (5 LOC.)	35.8	VF		
C10	C3-34	2.5'x6' INLET	7	EA		
C11	C3-35	2.5'x6' CATCH BASIN W/ 3' SUMP	9	EA		
C12	C3-33	2.5'x3' CATCH BASIN W/ 3' SUMP	5	EA		
C13	C3-32	2.5'x3' INLET	4	EA		
C14	C3-24	2'x2' INLET	1	EA		
C15	C3-61	SLOTTED VANE DRAIN, 15", 3LF SECTIONS	4	EA		
C16	C4-04	CONNECT TO EXISTING STORM SEWER MAIN	1	EA		
C17	C4-05	LATERAL CORE CONNECTION TO NEW STORM SEWER	1	EA		
C18	C4-01	CONNECT TO EX STORM STRUCTURE (EXISTING OPENING)	1	EA		
C19	C5-16	TUCKPOINT EXISTING STORM STRUCTURE	1	EA		
C20	C5-06	REMOVE EXISTING STORM SEWER 30" AND SMALLER	465	LF		
C21	C5-05	ABANDONED STORM SEWER FILL	1,025	LF		
C22	C5-15	CHIMNEY REBUILD OF STORM STRUCTURE	2.0	VF		
C23	C5-13	REPLACE FRAME AND COVER, EX STORM MH'S, CITY SUPPLIED	4	EA		

**TOTAL FOR DIVISION C (ITEMS 1-23)****DIVISION D - ROADWAY**

LINE ITEM	ITEM CODE	ITEM DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
D1	D1-10	ASPHALT MILLING	8735	SY		
D2	D1-12	MILLING DRIVEWAYS	5	EACH		
D3	D1-14	MILLING TRANSITION TO CURB AND GUTTER OVERLAY	608	LF		

D4	D1-15	REMOVING CONCRETE PAVEMENT	39	SY		
D5	D1-16	REMOVING CURB AND GUTTER	766	LF		
D6	D1-04	BASE AGGREGATE DENSE 1 1/4 INCH	194	TON		
D7	D2-05	31" CONCRETE CURB AND GUTTER	805	LF		
D8	D3-07	7" CONCRETE DRIVEWAY	290	SY		
D9	D3-18	ASPHALTIC DRIVEWAY REMOVE AND REPLACE	18	SY		
D10	D4-04	8" CONCRETE PAVEMENT	534	SY		
D11	D4-20	3 MT 58-28 S HMA PAVEMENT	2203	TON		
D12	D4-24	5 MT 58-28 S HMA PAVEMENT	920	TON		
D13	D4-27	UTILITY TRENCH RESTORATION	334	SY		
D14	D3-03	5" CONCRETE SIDEWALK	538	SF		
D15	D3-10	DETECTABLE WARNING FIELD	75	SF		
D16	D7-01	ADJUSTING WATER VALVE	6	EA		
D17	D7-05	ADJUSTING WATER MANHOLE	4	EA		
D18	D6-15	PAVEMENT MARKING EPOXY 4-INCH LINE, WHITE	1641	LF		
D19	D6-20	PAVEMENT MARKING STOP LINE 18-INCH EPOXY	51	LF		
D20	D6-37	PAVEMENT MARKING, 4-INCH, YELLOW EPOXY	1952	LF		
D21	D6-39	PAVEMENT MARKING, 12-INCH, WHITE EPOXY	236	LF		
D22	D6-43	PAVEMENT MARKING, RAISED INTERSECTION ARROW	4	EA		
D23	D6-44	PAVEMENT MARKING, CROSSWALK, 2-FOOT X 6-FOOT BLOCK, WHITE EPOXY	160	LF		
D24	D5-02	TOPSOIL AND SOD	1500	SF		
D25	D6-08	NEW SIGN POST	9	EA		
D26	D6-01	TRAFFIC CONTROL	1	LS		
D27	D5-01	EROSION CONTROL	1	LS		

**TOTAL FOR DIVISION D (ITEMS 1-27)**

**DIVISION E - STREET LIGHTING**

	NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL
E1	E1-01	LOCATE, TEST AND PROTECT EXISTING AND NEW CIRCUITS	1	LS		
E2	E1-02	TEMPORARY LIGHTING	1	LS		
E3	E1-05	COMPOSITE PULL BOX, 17X30X18	20	EA		
E4	E1-06	COMPOSITE PULL BOX, 30X48X36	1	EA		
E5	E1-16	1" HDPE DUCT	3,557	LF		
E6	E1-21	1¼" HDPE DUCT	20	LF		
E7	E1-31	2" HDPE DUCT BORED	637	LF		
E8	E1-42	3" DIAMETER SCHEDULE 40 PVC CONDUIT	782	LF		

E9	E2-05	ELECTRICAL WIRE 8 AWG	17,584	LF		
E10	E3-01	23-FT STANDARD CONCRETE LIGHT POLES, ARM AND FIXTURE	21	EA		
E11	E3-03	REMOVING DIRECT BURIED LIGHTING UNITS	21	EA		

**TOTAL FOR DIVISION E (ITEMS 1-11)**

\_\_\_\_\_

**TOTAL FOR ALL DIVISIONS A THROUGH E (ITEMS A1 - E11)**

\_\_\_\_\_

SAMPLE

## PRIME CONTRACTOR

With submission of this proposal, the prime contractor hereby certifies that they are performing a minimum of 1/3 of the value of work within this proposal. The total value of work being performed by the prime contractor is \_\_\_\_\_ dollars and \_\_\_\_\_ cents.

## SUBCONTRACTOR LIST

The following Subcontractors will be utilized for portions of the Project Work (only list those > \$25,000). Changes shall not be made subsequent to the Bid unless the change(s) is approved by the City. The contractor is required to complete and submit this list no later than 24 hours after the bid is due.

[illegible]



SAMPLE

**AFFIDAVIT OF COMPLIANCE WITH THE STATE OF WISCONSIN ACT 181  
(CHAPTER 103.503 OF THE STATE STATUTES)  
CONTROLLED SUBSTANCE PREVENTION PROGRAM**

State of \_\_\_\_\_ Project Name \_\_\_\_\_

\_\_\_\_\_ County Contract No. \_\_\_\_\_

I, \_\_\_\_\_, being duly sworn, state that:

1. I am the \_\_\_\_\_ of \_\_\_\_\_, a \_\_\_\_\_  
(State)  
Corporation, partnership, or individual of \_\_\_\_\_,  
(City, Village, \_\_\_\_\_) (State)  
and make this affidavit pursuant to the requirements of State of Wisconsin Act 181.
2. I have entered into the City of Wauwatosa's Contract No. \_\_\_\_\_ and the  
total cost (including labor, equipment and materials) of completing the contract will  
exceed \$48,000 if a single-trade project or \$200,000 if a multiple trade project.
3. The corporation, partnership or individual I represent has in place a Controlled  
Substance Prevention Program that is consistent with and meets the  
requirements of the State of Wisconsin Act 181.
4. I have confirmed that the subcontractors I plan to employ on this contract also  
have in place a Controlled Substance Prevention Program that is consistent with  
and meets the requirements of the State of Wisconsin Act 181.

Title

Officer Name

Address

President \_\_\_\_\_

Vice President \_\_\_\_\_

Secretary \_\_\_\_\_

Treasurer \_\_\_\_\_

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

Day of \_\_\_\_\_, 20\_\_\_\_

\_\_\_\_\_  
(Notary Signature)

\_\_\_\_\_  
(Contractor Signature)

Notary Public, State of \_\_\_\_\_

My Commission expires: \_\_\_\_\_

2. Accompanying this proposal is a \_\_\_\_\_  
(Bond-Certified Check)  
in the sum of \_\_\_\_\_ Dollars  
\$ \_\_\_\_\_ as required by the Advertisement for Bids.

3. This bid is based on the following subcontractors:

<u>Name</u>	<u>Address</u>	<u>Class of Work</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____

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

\_\_\_\_\_  
(Name of Corporation, partnership or person submitting bid)

a corporation organized and existing under the laws of the State of \_\_\_\_\_  
\_\_\_\_\_ ; a partnership consisting of an individual trading as \_\_\_\_\_  
\_\_\_\_\_ of the City of \_\_\_\_\_  
State of \_\_\_\_\_.

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 full authority to make such statements and submit this proposal in (its) (their) behalf, and that the said statements are true and correct.

Signature \_\_\_\_\_

\_\_\_\_\_  
(Title, if any)

Sworn and subscribed before me this  
\_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
(Notary or other officer authorized to administer oaths).

My Commission expires \_\_\_\_\_.

(Bidders should not add any conditions or qualifying statements to this proposal, as otherwise the proposal may be declared irregular as being not responsive to the advertisement. Do not remove Proposal Form from Contract Documents)

**SCHEDULE OF FIXED EXTRAS** (Apply only if there is no Bid Item for the same work or the work is specified as being included with another item)

**CONSTRUCTION:**

1.	Water Service alteration or relay 1 ¼" and smaller in diameter	\$175.00/Lin. Ft.
2.	Water Service alteration or relay 1 ½" to 2" in diameter	\$200.00/Lin. Ft.
3.	Remove & Replace Curb Stop	\$1,500.00 Each
4.	Water Service alteration larger than 2"	To be negotiated
5.	Adjust Manhole Frames	\$ 500.00 Each
6.	Adjust Catch Basin/Inlet Frames	\$ 500.00 Each
7.	Adjust Water Boxes	\$250.00 Each
8.	Internal Manhole Seal Removal and/or Installation	\$ 325.00 Each
9.	4" Underdrain Pipe (Complete)	\$ 15.00/Lin. Ft.
10.	Sawing concrete pavement	\$200.00 plus \$ 3.00/L.F. for each foot over 50 feet
11.	Sawing asphalt pavement	\$200.00 plus \$ 2.00/L.F. for each foot over 50 feet
12.	Sawing asphalt over concrete pavement.	\$200.00 plus \$ 3.50/L.F. for each foot over 50 feet
13.	Relay house sewers and drains (includes reconnect)	\$250.00/Lin. Ft.
14.	Reconnect house sewers and drains	\$450.00 Each
15.	Steel sheeting and bracing left in place	To be negotiated
16.	Close wood sheeting and bracing left in place	To be negotiated
17.	Spot wood sheeting and bracing left in place	To be negotiated
18.	Concrete Cradle	\$ 175.00/Cu. Yd.
19.	Concrete Cap	\$ 150.00/Cu. Yd.
20.	Borrow Excavation	\$ 20.00/Cu. Yd.

21.	Rock excavation by hand	\$ 330.00/Cu. Yd.
22.	Rock excavation by mechanical means	\$ 250.00/Cu. Yd.
23.	Buried concrete removal (including concrete encasement)	\$ 150.00/Cu. Yd.
24.	Concrete pole base removal & disposal	\$ 100.00 Each
25.	Base aggregate dense, 1-1/4 inch, tons in place including disposal of excess excavated materials.	\$ 18.00/Ton
26.	Excavated material used for backfill in lieu of gravel backfill – credit.	\$ 10.00/Cu. Yd.
27.	Aggregate slurry used for backfill in lieu of granular or crushed concrete backfill or vice versa	\$110.00/C.Y. under 5.0 C.Y. \$75.00/C.Y. over 5.0 C.Y.
28.	No. 2 stone for ditch bottom stabilization including disposal of excess excavated material	\$ 24.20/Ton
29.	Crushed limestone No. 1 or smaller, tons in place	\$15.00/Ton
30.	Utility structure masonry repairs	\$ 85.00/Vrt. In. or \$1020/Vrt. Ft.

RESTORATION: (Prices Include Removal and Disposal)

1.	8" concrete pavement.	\$ 70.00/Sq. Yd.
2.	8" concrete base course.	\$ 55.00/Sq. Yd.
3.	5" concrete sidewalk	\$8.00/Sq. Ft.
4.	7" concrete drive	\$ 9.00/Sq. Ft.
5.	Detectible Warning Fields	\$40.00/Sq. Ft.
6.	High strength early setting concrete/"9 bag"	125% of bid price for the relevant pavement type
7.	Vertical face concrete curb and gutter	\$ 42.00/Lin. Ft.
8.	Mountable concrete curb and gutter	\$ 43.00/Lin. Ft.

9.	Concrete Steps	\$ 75.00/Lin. Ft.
10.	Pavement Milling (Asphalt)	\$ 4.00/Sq. Ft.
11.	Pavement Milling (Concrete)	\$ 6.00/Sq. Ft.
12.	Tack Coat	\$ 5.00/Gal.
13.	Asphalt pavement Less than 30 tons in place Greater than 30 tons in place	\$ 90.00/Ton \$ 80.00/Ton
14.	Temporary bituminous cold patch or temporary HMA	\$ 120.00/Ton
15.	Topsoil & Sodding	\$ 1.50/Sq. Ft.
16.	Topsoil, Seeding & Mulching	\$ 0.90/Sq. Ft.
17.	Topsoil, spread	\$ 30.00/Cu. Yd.
18.	Concrete pavement dowel bars.	\$ 9.50 Each
19.	Concrete pavement tie bars.	\$ 7.00 Each

EROSION CONTROLS - ALL ITEMS TO INCLUDE MAINTENANCE: (incidental in this contract)

1.	Silt fence erection and maintenance.	\$ 4.00/Lin. Ft.
2.	Hay Bales.	\$ 7.00 Each
3.	Ditch protection	\$ 6.50/Lin. Ft.
4.	Catch basin and inlet screens.	\$ 50.00 Each
5.	Catch basin and inlet baskets.	\$ 150.00 Each
6.	Tracking Pad Stone	\$ 25.00/Ton

## **SCHEDULE OF FIXED EXTRAS (CONTINUED)**

### **REPAIR OF WATER MAIN BREAKS DURING CONSTRUCTION**

Contractor shall repair all main breaks on existing mains that occur during normal working hours. The Water Works will normally operate the valves for the shutoff.

In emergency situations, the contractor may operate the valves with proper notification and authorization.

Where repairs are made on mains that will be abandoned, the Contractor shall furnish all repair material. The Contractor shall have a minimum of 2 repair clamps, 2 dual purpose sleeves, and 1 length of ductile iron, cast iron or PVC pipe of the existing pipe size on the job before the job starts and at all times thereafter. This repair material need not conform to the standard specifications.

When repairs are required on mains that will remain in service, the contractor shall also furnish all repair materials. The contractor shall have a minimum of 2 repair clamps, 2 dual purpose sleeves, and 1 length of ductile iron, pipe Special Class 54 and of the same size as the existing pipe on the job before the job starts and at all times thereafter. This repair material shall conform to the standard and Wauwatosa's specifications. Where, in unusual circumstances, the City furnishes materials, the cost of such material will be deducted from the amount due the contractor.

All breaks occurring as a result of the negligence of the contractor, whether from actual construction or faulty operation of hydrants and valves, shall be repaired at their own expense. Where the break occurs while exercising normal care, the Contractor will be compensated for the repair of each break as follows:

- a. Where the break can be repaired without replacing pipe and no excavation is required, the Contractor will be paid \$1,300.00.
- b. Where the break can be repaired without replacing pipe, and the Contractor must excavate, the Contractor will be paid \$1,900.00.
- c. Where a piece of pipe must be removed and replaced, including any excavation required to complete the repair, the Contractor will be paid \$2,500.00.

The Contractor, at their own expense, shall repair water services or branches damaged, as a result of the construction.

## **SECTION 400 - MINIMUM WAGE SCALE**

Section intentionally omitted pursuant to 2015 Wisconsin Act 55, effective January 1, 2017.



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## **SECTION 500 - GENERAL CONDITIONS**

### **501 - SCOPE OF WORK**

#### **501.01 - INTENT OF CONTRACT DOCUMENTS**

The contract documents are complimentary, and what is called for in one shall be as binding as if called for in all. The true intent of the plans and these specifications is to provide for the construction, execution and completion in every detail of a complete work or improvement which the Contractor undertakes to do in full compliance with the plans, specifications, official notice, general conditions, proposal and the contract. The Contractor shall perform all items of work covered and stipulated in the proposal and perform altered or extra work, all in accordance with the lines, grades, typical sections and dimensions given, and shall furnish, (unless otherwise provided), all materials, implements, machinery, equipment, tools, supplies, transportation and labor necessary to the prosecution and completion of the work.

#### **501.02 - SPECIAL WORK**

Should any construction or requirements not covered by these general conditions become necessary, special provisions for the same will be prepared which special provisions shall be considered as a part of these specifications the same as though contained fully herein.

#### **501.03 – CHANGES**

The City Engineer may at any time, by a written order, and with notice to the sureties, make changes in the plans and/or specifications of this contract all within the general scope thereof.

#### **501.04 - INCREASED OR DECREASED QUANTITIES OF WORK**

If the City Engineer deems it proper or necessary in the execution of the work to make changes which will increase or decrease the quantity of labor or material or the expense of the work, such changes shall not annul nor vitiate the contract or agreement hereby entered into nor release the surety thereon, and the Contractor shall furnish the necessary labor and material to complete the contract as changed.

Items for which quantities change are categorized as major or minor items. A major item shall be considered to be any item whose total cost, determined by multiplying the original quantity and the contract unit price, is equal to or greater than five percent of the total amount of the original contract. A minor item is one of which total cost, determined, as above, is less than five percent of the total amount of the original contract.

When the actual quantity of any major item required to complete the work is increased or decreased, payment for the quantity of work actually performed for such item will be made in accordance with the table below:

**Increased or Decreased Quantities of Work**

Item	Actual Quantity as % of Contract Quantity	Basis of Payment
Major ( $\geq 5\%$ of Total Contract)	75% - 125%	Contract Unit Prices
Major ( $\geq 5\%$ of Total Contract)	$< 75\%$	Adjusted Unit Prices (not to exceed cost for 75% of contract quantity times the contract unit price)
Major ( $\geq 5\%$ of Total Contract)	$> 125\%$	Adjusted Unit Prices for units $> 125\%$ of contract quantity. (Contract Unit Prices for all units up to 125% of contract quantity).
Minor ( $< 5\%$ of Total Contract)	All	Contract Unit Prices

The adjustment or revision of unit prices shall be negotiated on the basis of actual cost for the entire item plus a reasonable allowance for profit and applicable overhead.

If such changes cause an increase or decrease in the time required for its performance, an equitable adjustment shall be made and the contract shall be modified in writing accordingly.

No changes shall be made without first obtaining the approval in writing of the City Engineer or their duly authorized representative. Any claim for adjustment under this section must be asserted within ten (10) days from the date the change is ordered, unless the City Engineer shall for proper cause extend such time. Nothing provided in this section shall excuse the Contractor from proceeding with the prosecution of the work so changed.

**501.05 - CHANGED CONDITIONS**

Should the Contractor encounter or the City discover during the progress of the work, subsurface and/or latent conditions at the site materially differing from those shown on the drawing or indicated in these specifications, the attention of the City Engineer shall be called immediately to such conditions, and, if Contractor finds that the materials differ from those shown on the drawings, or indicated in these specifications, Contractor shall at once make such changes in the drawings and/or specifications, as Contractor may find necessary.

#### 501.06 - EXTRA WORK

The Contractor may be ordered by the City Engineer to perform additional work and furnish materials which do not appear in the proposal or contract as a specific item accompanied by a unit price, or lump sum price, and which are not included under the price bid for other items in the contract. All such work and materials shall be designated as extra work. The Contractor shall perform extra work whenever it is deemed necessary or desirable by the City Engineer to fully complete the project as contemplated and it shall be done in accordance with the intent of these specifications.

Extra work shall be done under the supervision of the City Engineer and their decision shall be final and binding. The plan of the work to be followed, the equipment to be used and the amount and character of labor to be employed shall meet with the approval of the City Engineer. Authorization for extra work shall be given by the City Engineer in writing. The Contractor shall perform the extra work by force account when so ordered by the City Engineer. Work performed on a cost-plus-limited basis shall have itemized statements submitted in accordance with 109.4.5.1(3) of the State Specs. Claims for extra work which have not been authorized by the City Engineer will be rejected.

#### 501.07 - MEASUREMENT OF QUANTITIES

All work acceptably completed under the contract shall be measured by United States standard measures in accordance with well recognized engineering practice and quantities of work performed shall be computed from such measurements.

The completed work will be measured by the City Engineer to determine the quantities of the various items of work performed. The Contractor will, in all cases, be paid for the actual amount of work performed in accordance with these specifications as shown by the final measurements, said measurements being made in accordance with the terms of the contract.

#### 501.08 - SCOPE OF PAYMENTS

The Contractor shall accept the compensation, as herein provided, in full payment for furnishing all material, labor, tools, and equipment necessary to the completed work and for performing all work contemplated and embraced under the contract; also for loss or damage arising from the nature of the work; or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the work until the final acceptance by the City Engineer, and for all risks of every description connected with the prosecution of the work, also for all expenses incurred in consequence of the suspension or discontinuance of the work herein specified, and for completing the work according to the plans and specifications, and shall indemnify and hold the City harmless from any and all losses, damages, costs, expenses, actions, and judgments resulting from any infringement of patent, trademark, or copyright.

The payment of any estimate, for partial payment, prior to final acceptance of the work by the City, shall in no way constitute an acknowledgment of the acceptance of the work, nor in any way prejudice or affect the obligation of the Contractor, at the Contractor's expense, to repair, correct, renew, or replace any defects or imperfections in the construction or in the strength or quality of the materials in or about the construction of the work under contract and its appurtenances, nor any damage due or attributed to such defects, which defects, imperfections or damage shall have been discovered on or before the final inspection and acceptance of the work. The City Engineer shall be the sole judge of such defects, imperfections or damage and the Contractor shall be liable to the City for failure to correct the same as provided herein.

No monies payable under the contract or any part thereof shall become due and payable if the City so elects until the Contractor shall satisfy the City that the Contractor has fully settled or paid for all materials used in or upon the work and labor done in connection therewith, and the City, if it so elects, may pay any or all such bills, wholly or in part, and deduct the payment thereof from any partial or final payment.

#### 501.09 - PAYMENT FOR INCREASED OR DECREASED QUANTITIES

When alterations in the plans or quantities of work as herein provided are ordered or negotiated, the Contractor shall accept payment in accordance with the provisions of Section 502.14, and no allowance will be made for any increased expense, loss of expected reimbursement, or loss of anticipated profits suffered or claimed by the Contractor resulting either directly from such alterations or indirectly from unbalanced allocation among the contract items of overhead expense on the part of the bidder and subsequent loss of expected reimbursement thereof, or from any other cause.

#### 501.10 – PROGRESS AND FINAL PAYMENTS

##### 501.10.1 Schedule of Values

- A. The Schedule of Values established as provided in Section 300 will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to the City Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

##### 501.10.2 Progress Payments

- A. Applications for Payments:
  - 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), the Contractor shall submit to the City Engineer for review an Application for Payment filled out and signed by the Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.

- (a) If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
- 2. Retainage shall be an amount equal to 5 percent (5%) of said estimate until 50 percent of the work has been completed. At 50 percent (50%) completion, no additional amounts will be retained, and further partial payments will be made in full to the contractor and unless the City Engineer certifies that the job is not proceeding satisfactorily, but amounts previously retained shall not be paid to the contractor. At 50 percent (50%) completion or any time thereafter when the progress of the work is not satisfactory, additional amounts may be retained but in no event shall the total retainage be more than 10 percent (10%) of the value of the work completed. Upon substantial completion of the work, an amount retained may be paid to the contractor. When the work has been substantially completed, except for work which cannot be completed because of weather conditions, lack of materials, or other reasons which in the judgment of the City are valid reasons for non-completion, the City may make additional payments, retaining at all times an amount sufficient to cover the estimated cost of the work still to be completed or, in the alternative, may pay out entire amount retained and receive from the contractor guarantees in the form of a bond or other collateral sufficient to insure completion of the contract.

B. Review of Applications:

- 1. City Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing City Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
- 2. City Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by City Engineer, based on City Engineer's observations of the executed Work as an experienced and qualified design professional, and on City Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of City Engineer's knowledge, information and belief:
  - a. the Work has progressed to the point indicated;

- b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under (d.), and any other qualifications stated in the recommendation); and
  - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is City Engineer's responsibility to observe the Work.
  - d. City Engineer will document the actual quantities and classifications of Unit Price Work performed by Contractor. City Engineer will review with Contractor the City Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). City Engineer's written decision thereon will be final and binding (except as modified by City Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of this section.
- 3. By recommending any such payment City Engineer will not thereby be deemed to have represented that:
  - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to City Engineer in the Contract Documents; or
  - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
- 4. Neither City Engineer's review of Contractor's Work for the purposes of recommending payments nor City Engineer's recommendation of any payment, including final payment, will impose responsibility on City Engineer:
  - a. to supervise, direct, or control the Work, or
  - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
  - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
  - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or



- e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. City Engineer may refuse to recommend the whole or any part of any payment if, in City Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 501.10.2 B.2. City Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in City Engineer's opinion to protect Owner from loss because:
- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
  - b. the Contract Price has been reduced by Change Orders;
  - c. Owner has been required to correct defective Work or complete Work in accordance with Section 502.09; or
  - d. City Engineer has actual knowledge of the occurrence of any of the events enumerated in Section 502.11.

C. Payment Becomes Due:

1. Ten days after presentation of the Application for Payment to Owner with City Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 510.10.2.D and calendar placement on the next available Board of Public Works Agenda) become due, and when due will be paid by Owner to Contractor.

D. Reduction in Payment:

1. Owner may refuse to make payment of the full amount recommended by City Engineer because:
- a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
  - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
  - c. there are other items entitling Owner to a set-off against the amount recommended; or
  - d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 510.10.2.B and Sections 502.11 and 502.12.

2. If Owner refuses to make payment of the full amount recommended by City Engineer, Owner will give Contractor immediate written notice (with a copy to City Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.
3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 510.10.2.C and subject to interest as provided in the Agreement.

#### 501.10.3 Contractor's Warranty of Title

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

#### 501.10.4 Final Payment

##### A. Application for Payment:

1. After Contractor has, in the opinion of City Engineer, satisfactorily completed all corrections identified as defined in Section 502.19.2 and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents, wage affidavits, and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
  - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Section 504.17;
  - b. consent of the surety, if any, to final payment;
  - c. a list of all Claims against Owner that Contractor believes are unsettled; and
  - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 510.10.4.A.2 and as approved by Owner, Contractor may furnish receipts or releases in

full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. City Engineer's Review of Application and Acceptance:

1. If, on the basis of City Engineer's observation of the Work during construction and final inspection, and City Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, final payment is per the provisions of Section 502.19.3. Otherwise, City Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due:

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by City Engineer, less any sum Owner is entitled to set off against City Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

501.10.5 Final Completion Delayed

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if City Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of City Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Section 504, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to City Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

501.10.6 Waiver of Claims

- A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final acceptance pursuant to Section 502.19.3, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled

#### 501.11 – CLEAN UP

The Contractor shall at all times keep the premises free from accumulations of waste material or rubbish caused by their employees or work and Contractor shall remove all their rubbish from and about the site and all their tools, equipment, scaffolding and surplus materials and shall leave the work clean and ready for use. In case of dispute, the City may remove the rubbish and surplus materials and charge the cost to the Contractor and the Contractor agrees to reimburse such cost to the City.

#### 501.12 - FINAL CLEANING UP

Within fourteen (14) calendar days after the completion of the work and before acceptance and payment will be made, the Contractor shall clean and remove from the site of the work and adjacent property all surplus and discarded materials, rubbish and temporary structures, restore in an acceptable manner all property, both public and private, which has been damaged in the prosecution of the work and shall leave the site of the work in a neat and presentable condition.

## **SECTION 502 - CONTROL OF THE WORK**

### **502.01 - AUTHORITY OF CITY ENGINEER**

All work shall be done under the supervision of the Board of Public Works represented by the City Engineer and to their satisfaction. The City Engineer shall decide 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 these specifications. The City Engineer shall determine the amount and quantity of work performed and materials furnished.

### **502.02 - PLANS AND SHOP DRAWINGS**

The approved plans will be supplemented by such shop drawings as are necessary to adequately control the work. It is mutually agreed that all authorized alterations affecting the requirements and information given on the approved plans shall be in writing. No changes shall be made on any plan or drawing after the same has been approved by the City Engineer except by direction of the City Engineer.

#### **Shop Drawings and Samples**

- A. Contractor shall submit Shop Drawings and Samples to City Engineer for review and approval. Each submittal will be identified as City Engineer may require.
  - 1. Shop Drawings:
    - a. Submit number of copies specified in the General Requirements.
    - b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show City Engineer the services, materials, and equipment Contractor proposes to provide and to enable City Engineer to review the information for the limited purposes required by Paragraph 502.02 D.
  - 2. Samples:
    - a. Submit number of Samples specified in the Specifications.
    - b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as City Engineer may require to enable City Engineer to review the submittal for the limited purposes required by Paragraph 502.02 D.
- B. Where a Shop Drawing or Sample is required by the Contract Documents, any related Work performed prior to City Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. Submittal Procedures:

1. Before submitting each Shop Drawing or Sample, Contractor shall have:
  - a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
  - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
  - c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
  - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal. Submittals not bearing a stamp or specific written certification will be returned without review to the contractor for resubmittal.
3. With each submittal, Contractor shall give City Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to City Engineer for review and approval of each such variation.

D. City Engineer's Review:

1. City Engineer will provide timely review of Shop Drawings and Samples. City Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. City Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. City Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 502.02 C.3 and City Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. City Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 502.02 C.1.

E. Resubmittal Procedures:

1. Contractor shall make corrections required by City Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by City Engineer on previous submittals.
2. The Contractor shall be allowed one (1) submittal of each item for review. Additional submittals required due to non-conformance with the specifications, including rejected or incomplete submittals, will be assessed \$250 per item per resubmittal. Any amounts assessed under this specification shall be deducted from payment for the work.

502.03 - CONFORMITY WITH PLANS AND ALLOWABLE DEVIATIONS

Finished work in all cases shall conform with lines, grade, sections, details and dimensions of the work contemplated as shown on the approved plans. Such deviations from the approved plans and shop drawings, as may be required by the exigencies of construction, will, in all cases, be determined by the City Engineer and authorized in writing.

502.04 - COORDINATION OF PLANS - SPECIFICATIONS, ETC.

The specifications, the plans and all supplementary documents are essential parts of the contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be compatible to describe and provide for a complete work. In case of discrepancy, figured dimensions shall govern over scaled dimensions, plans shall govern over special provisions, and special provisions shall govern over all other specifications.

The Contractor shall take no advantage of any apparent error or omission in the plans or specifications and the City Engineer shall be permitted to make such corrections and interpretations as may be deemed necessary for the fulfillment of the intent of the plans and specifications.

#### 502.05 - COOPERATION BY CONTRACTOR

The Contractor shall conduct their operations so as to interfere as little as possible with those of other Contractors, subcontractors or the public on or near the work.

The Contractor shall arrange and conduct their work so as not to interfere with the operations of other Contractors engaged on adjacent work and to join the work of this contract, including any additional, authorized work, to that of others in a proper manner and in accordance with the spirit of the plans and specifications and to perform his work in the proper sequence to that of other adjacent work all as may be directed by the City Engineer.

The Contractor shall be held responsible for any damage done the Contractor or the Contractor's agents to the work performed by another Contractor.

In case of a dispute arising between two or more Contractors engaged on the same work, as to the respective rights of each under these specifications, the City Engineer shall determine the matters at issue and shall define the respective rights of the various interests involved in order to secure the completion of all parts of the work in general harmony and with satisfactory results, and their decision shall be final and binding on all parties concerned and shall not in any way be a cause for claims for extra compensation by any of the parties.

The Contractor will be supplied two copies of the executed contract documents and an electronic pdf copy of the construction plans, construction specifications, and any subsequent necessary revisions. The Contractor shall at all times have available on the job site one copy of said contract documents complete with any revisions to the plans or specifications; Contractor shall give the work the constant attention necessary to facilitate the progress thereof and shall cooperate with the City Engineer and with the other Contractors in every way possible.

#### 502.06 - CONSTRUCTION STAKES

The City Engineer will furnish and set the survey stakes for the general location, alignment, grade, and other necessary points with proper notes thereon. The Contractor shall notify the City Engineer not less than seventy two (72) hours (or three (3) working days, whichever is greater,) in advance of when and where grade and points are desired.

The Contractor shall be responsible for the preservation of all stakes and marks, and if in the opinion of the City Engineer any of the survey stakes or marks have been carelessly or willfully destroyed or disturbed by the Contractor, the cost to the City of replacing them shall be charged against the Contractor and shall be deducted from the payment for the work.



## 502.07 - AUTHORITY AND DUTIES OF INSPECTORS

Inspectors, employed by the City, shall be authorized to inspect all work done and all material furnished. Such inspection may extend to all or any part of the work and to the preparation, fabrication or manufacture of the materials to be used. The inspector is not authorized to revoke, alter, or waive any requirements of the specifications. Inspector is authorized to call the attention of the Contractor to any failure of the work or material to conform to the specifications and the contract and shall have authority to reject materials or suspend the work until any questions at issue can be referred to and decided by the City Engineer.

The inspector shall in no case act as foreman or perform other duties for the Contractor nor interfere with the management of the work by the latter. Any advice which the inspector may give the Contractor shall in no way be construed as binding the City Engineer in any way or releasing the Contractor from fulfilling any of the terms of the contract.

If the Contractor refuses to suspend operations on verbal order, the inspector shall issue a written order giving the reason for shutting down the work. After placing the order in the hands of the man in charge, the inspector shall immediately leave the job. Work done after the inspector leaves the job will not be accepted or paid for.

## 502.08 – INSPECTION

All material and each part or detail of the work shall be subject at all times to inspection by the City Engineer or their authorized representative, and the Contractor will be held strictly to the true intent of the specifications in regard to quality of materials, workmanship and the diligent execution of the contract. Such inspection may include mill, plant or shop inspection, and any material furnished under these specifications is subject to such inspection. The City Engineer or their representatives shall be allowed access to all parts of the work and shall be furnished with such information and assistance by the Contractor as is determined by the City Engineer or their representative, to make a complete and detailed inspection.

The Contractor shall, if the City Engineer requests, remove or uncover such portion of the finished work as the City Engineer may direct before the final acceptance of the same. After the examination, the Contractor shall restore said portion of the work to the standard required by the specifications. If the work thus exposed or examined proves acceptable, the expense of uncovering or removing and the replacing of the parts removed shall be paid for as extra work, but, if the work so exposed or examined is unacceptable, the expense of uncovering or removing and the replacing of the same in accordance with the specifications shall be borne by the Contractor.

Failure or neglect on the part of the City Engineer to condemn or reject bad or inferior work or materials shall not be construed to imply an acceptance of such work or materials, if it becomes evident at any time prior to the final acceptance of the work by the Common

Council. Neither shall it be construed as barring the City, at any subsequent time, from the recovery of damages or of such a sum of money as may be needed to build anew all portions of the work in which fraud was practiced or improper materials hidden, wherever found.

#### 502.09 - REMOVAL OF DEFECTIVE AND UNAUTHORIZED WORK

Work performed without lines and grades being given, work performed beyond the lines and grades shown on the plans or as given, except as herein provided, or any unclassified work done without written authority will be considered as unauthorized and at the expense of the Contractor and will not be measured or paid for by the City. Work so done may be ordered removed and replaced at the Contractor's expense.

All work not conforming to the requirements of these specifications shall be considered as defective and will be rejected. The Contractor shall remove and renew or repair all such defective work as ordered in writing by the City Engineer.

Should the Contractor fail or refuse to remove or renew any defective work performed previously or to make any necessary repairs in an acceptable manner and in accordance with the requirements of the contract and specifications within three days after notification in writing, the City Engineer shall have the authority to cause the unacceptable or defective work to be removed and renewed or repaired at the Contractor's expense. Any expense incurred by the City in making these removals, renewals or repairs, which the Contractor has failed or refused to make shall be paid out of any monies or which may become due the Contractor. The City shall have authority to take over and use defective work without compensation to the Contractor when the Contractor fails or refuses to rebuild such faulty work.

#### 502.10 - TERMINATION OR SUSPENSION

In the event that any of the provisions of this contract are violated by the Contractor or by any of the Contractor's subcontractors, or in the event the work to be performed under this contract shall not be prosecuted with such diligence and with such number of men as to insure its completion within the time limited by this Contract, the City by its City Engineer may serve written notice upon the Contractor and their surety notifying the Contractor and their surety of the Contractor's violations or the Contractor's failure to prosecute the work, and that the City by its City Engineer will suspend the work of the Contractor under this contract or terminate this contract unless the Contractor within the time limitation provided for in such notice by the City Engineer desists from all violations under this contract or makes satisfactory arrangements with the City Engineer for the corrections of and the compliance with all the provisions of this contract. In the event the Contractor fails to comply with the provisions in the notice from the City Engineer within the time limitation provided in such notice by the City Engineer, the Board of Public Works of the City shall be authorized to take charge of and employ men and secure materials for the completion of the work under this contract or re-let the work to be performed under

this contract to another responsible Contractor, or authorize the Contractor's surety to take charge of the work and perform the work under this contract by a Contractor acceptable to the City Engineer, all to the account of and the expense of the Contractor and their surety and to apply the amounts retained by the City to the completion of the work under this contract.

In the case the City shall declare the Contractor in default as to a part of the work only, the Contractor shall discontinue such part, shall continue performing the remainder of the work in strict conformance with the terms of the contract, and shall in no way hinder or interfere with any other Contractor or persons whom the Board of Public Works of the City or its City Engineer may engage to complete the work as to which the Contractor was declared in default.

#### 502.11 - RIGHT TO WITHHOLD CERTAIN AMOUNTS AND MAKE APPLICATION THEREOF

In addition to the payment to be retained by the City under the preceding provisions of these General Conditions, the City may withhold a sufficient amount of any payment otherwise due to the Contractor, to cover (a) payments that may be past due or payable for just claims for labor or materials furnished in and about the performance of the work on the Project under the contract, (b) for defective work not remedied, (c) for failure of the Contractor to make proper payments to subcontractors, or others caused by the act of neglect of the Contractor or of any of their subcontractors, agents, or employees, and (e) for any past due and unpaid obligations owing by the Contractor to the City. The City shall disburse and the Contractor does authorize the City to act as agent for the Contractor in disbursing such funds as have been withheld pursuant to this paragraph to the party or parties who are entitled to payment therefrom. The City will render to the Contractor a proper accounting of all such fund disbursed in behalf of the Contractor.

#### 502.12 - DEFINITION OF NOTICE

Unless otherwise provided, where, in any of the contract documents, there is any provision in respect to giving of any notices, such notice shall be deemed to have been given, as to the City, when written notice shall be delivered to the City Engineer of the City or their authorized agent or shall have been placed in the United States mails addressed to the chief executive of the City at the place where the bids or proposals for the contract were opened; as to the Contractor, when a written notice shall be delivered to the chief representative of the Contractor at the site of the project or by mailing such written notice in the United States mails addressed to the Contractor at the place stated in the papers prepared by them to accompany the Contractor's proposal as the address of the Contractor's permanent place of business; as to the surety on the performance bond, when a written notice is placed in the United States mails addressed to the surety at the home office of such surety or its agent or agents who executed such performance bond on behalf of such surety.

## 502.13 - PAYMENT FOR EXTRA, ADDITIONAL OR OMITTED WORK

The City upon proper action by its governing body, may authorize changes in, additions to, or deductions from the work to be performed or the material to be furnished pursuant to the provisions of the contract or any other contract documents.

Adjustments, if any, in the amounts to be paid to the Contractor by reason of any such change, addition or deduction shall be determined by one or more of the following methods:

- (a) By unit prices contained in the Contractor's original bid and incorporated in the construction contract.
- (b) By a supplemental schedule of prices contained in the Contractor's original bid and incorporated in the construction contract.
- (c) By an acceptable lump sum proposal from the Contractor not to exceed fifteen (15%) percent of the original contract price for all extra, additional or omitted work to comply with Section 62.15(1c) of the Wisconsin Statutes. For lump sum proposals submitted by a subcontractor, the city will allow the contractor a markup on work the subcontractor performs as follows:
  - Use a markup of 10% for the first \$10,000 of work.
  - Use a markup of 2% for work in excess of \$10,000.
- (d) On a cost-plus-limited basis not to exceed fifteen percent (15%) of the original contract price to comply with Section 62.15 (1c) of the Wisconsin Statutes. A cost-plus-limited basis is defined as the cost of labor, materials and insurance, plus fifteen percent (15%) of the said cost to cover superintendence, general expense, overhead, and profit. Equipment necessary to complete work on a cost-plus-limited basis will be paid as an hourly rate and shall include no mark-up above the hourly rate.
  1. Labor – The city will pay the contractor's labor costs at the contractor's personnel actual wage rates or wage rates previously agreed upon with the city, in writing, for personnel directly involved in producing and supervising the cost-plus-limited basis work. The city will only pay for hours that personnel are actually engaged in cost-plus-limited basis work. The city will also reimburse the contractor based on actual costs paid to, or on behalf of, workers for subsistence and travel benefits, health and welfare benefits, pension fund benefits and other contractor-paid benefits. The city will pay no part of wages or benefits for personnel connected with the contractor's forces above the classification of foreman and having only general supervisory responsibility for the cost-plus-limited basis work.

2. Materials – The city will pay the Contractor based on actual invoiced costs, including applicable taxes and actual freight charges, for engineer-approved materials the contractor uses in force account work. If the contractor uses materials from the contractor's stock, the city and the contractor will agree on the price. Do not incorporate materials into the work without agreement. The city reserves the right to furnish materials as it deems appropriate. Make no claims for the costs, overhead, or profit on materials that the city provides.
3. Insurance – The city will pay the contractor based on actual invoiced costs for property damage, liability and workers compensation insurance premiums, unemployment insurance contributions and social security taxes on work performed on a cost-plus-limited basis. The contractor shall furnish satisfactory evidence of the rates actually paid.
4. Equipment – The city will pay for the use of contractor-owned equipment the engineer approves for work on a cost-plus-limited basis only during the hours that it is operated to the nearest half hour. Contractor-owned equipment expense rates will be paid as given in EquipmentWatch Cost Recovery (formerly Rental Rate Blue Book). Base all rates on revisions effective January 1 for all equipment used in that calendar year and provide the engineer with a copy of the rate sheet for each piece of equipment used.

<http://equipmentwatch.com/estimator/>

For equipment not listed in EquipmentWatch, provide an expense rate and furnish cost data to support that rate.

Rental equipment will be paid at the rental cost as invoiced by the rental company.

The city will not pay rental for tools or equipment with a replacement value of \$500 or less.

The engineer may reject equipment not in good working condition or not properly sized for efficient performance of the work.

If a subcontractor performs work on a cost-plus-limited basis, the city will allow the contractor a markup on work the subcontractor performs as follows:

- Use a markup of 10% for the first \$10,000 of work.
- Use a markup of 2% for work in excess of \$10,000.

No claim for an addition to the contract sum shall be valid unless authorized as aforesaid.

#### 502.14 - DISPUTED WORK

If the Contractor is of the opinion that any work required, necessitated, or ordered, is contrary to the terms and provisions of this Contract, Contractor must promptly notify the City Engineer in writing, of their intentions with respect thereto, and request a final determination thereon. If the City Engineer determines that the work in question is contract work and not extra work, or that the order complained of is proper, the City Engineer will direct the Contractor to proceed and the Contractor shall promptly comply. In order, however, to reserve the Contractor's right to claim compensation for such work or damages resulting from such compliance, the Contractor must, within 5 days after receiving notice of the City Engineer's determination and direction, notify the City Engineer, in writing, that the work is being performed or that the determination and direction is being complied with, under protest. Failure of the Contractor so to notify shall be deemed as a waiver of claim for extra compensation or damages therefor.

Before final acceptance by the City, all matters of dispute must be adjusted to the mutual satisfaction of the parties thereto. Determinations and decisions, in case any question shall arise, shall constitute a condition precedent to the right of the Contractor to receive the money therefor, until the matter in question has been adjusted.

#### 502.15 - ASSIGNMENT OF CONTRACT

The Contractor shall not assign this contract or any part hereof without the written consent of the City.

#### 502.16 - SUBCONTRACTING

The Contractor shall not subcontract any work to be performed or any materials to be furnished in the performance of the contract without the written consent of the City. If the Contractor shall sublet any part of this contract, the Contractor shall be as fully responsible to the City for the acts and omissions of their subcontractor(s) and of the persons either directly or indirectly employed by any subcontractor(s) as Contractor is for the acts and omissions of the persons directly employed by the Contractor. The Contractor must perform with their own organization, work amounting to at least one-third of the original contract amount unless a larger portion is specified in the contract.

#### 502.17 - "OR EQUAL" CLAUSE

Whenever in any of the contract documents an article, material or equipment is defined by describing a proprietary product, or by using the name of a manufacturer or vendor, the term "or equal," if not inserted, shall be implied. The specific article, material or equipment mentioned shall be understood as indicating the type, function, minimum standard of design, efficiency and quality desired and shall not be construed in such a manner as to exclude manufacturers' products of comparable quality, design, or efficiency. The Contractor shall comply with the requirements of the contract documents relative to the City's approval of materials and equipment before they are incorporated in

the project. The City Engineer shall decide and shall be the final authority on all questions which arise as to the quality of alternate materials referred to above.

#### 502.18 - OPENING OF SECTION OF ROADWAY TO TRAFFIC

When the contract provides that the road or portions thereof shall be closed to traffic during construction, the work shall not be opened to traffic until so directed or authorized by the City Engineer. Whenever all of the work or any portion thereof is in an acceptable condition for travel, such sections shall be opened to traffic as may be directed by the City Engineer in writing, but such opening shall not be construed as assumption of the maintenance by the City unless specifically provided, nor as an acceptance of the roadway or any part of it, nor as a waiver of any of the provisions of the specifications and contract; provided, however, that on such sections of the project as are used by traffic, the Contractor shall not be required to assume any expense entailed in maintaining that portion of the roadway used by traffic which expense is solely attributable to such traffic use and beyond the control and without fault of the Contractor, including costs in connection with those traffic control devices or facilities required. Such expense shall be borne by the City or shall be compensated for as Extra Work. Any damage to the highway not attributable to traffic which might occur on such sections shall be repaired by the Contractor at their own expense.

Whenever the Contractor is required to open to traffic all of the work or any portion thereof in accordance with the provisions given herein, or whenever Contractor shall of their own volition and when so authorized by the City Engineer, open to traffic all of the work or any portion thereof prior to final acceptance, Contractor shall conduct the remainder of the construction operations so as to cause the least obstruction to traffic.

#### 502.19 – ACCEPTANCE

##### 502.19.1 Partial Acceptance

When requested by the Contractor and upon specific approval of the City Engineer prior to final inspection and acceptance, the Contractor may be relieved of maintenance of sections of the work which have been completed. Such partial acceptance and assumption of the maintenance by the City shall be covered by a written notice from the City Engineer to the Contractor, and such notice shall definitely designate the sections of the work on which the Contractor is to be relieved of maintenance and shall also set for the date upon which such notice will be effective.

Such action will not be construed to be final inspection or acceptance of any part of the work, nor to be a waiver of any legal rights prescribed under this contract.

##### 502.19.2 Project Acceptance

###### A. General

1. Notify the City Engineer when the project is substantially complete as defined in 502.19.2.C. As soon as practicable, the City Engineer will inspect the work and categorize it as one of the following:
  - i. Unacceptable or not complete.
  - ii. Substantially complete.
  - iii. Complete.

B. Unacceptable or Not Complete

1. The City Engineer will identify, in writing, work that is unacceptable or not complete. Immediately correct or complete that work. The City Engineer will assess contract time until the work is corrected or completed.
2. Proceed as specified in 502.19.2.A until the City Engineer determines that the work is complete.

C. Substantially Complete

1. The project is substantially complete and the City Engineer will no longer assess contract time if the contractor has completed all contract bid items and change order work, except for the punch list. As applicable, the following must have occurred:
  - i. All lanes of traffic are open on a finished surface.
  - ii. All signage and traffic control devices are in place and operating.
  - iii. All storm sewer, water main, sanitary sewer, and electrical systems are tested and operational.
  - iv. All drainage, erosion control, excavation, and embankments are completed.
  - v. All safety appurtenances are completed.
  - vi. All landscaping work has been completed.
2. The City Engineer will provide a written punch list enumerating work the contractor must perform and documents the contractor must submit before the City Engineer will categorize the work as complete.
  - i. Punch list work includes uncompleted cleanup work required under 501.12 and minor corrective work. Immediately correct or complete the punch list work. The City Engineer may restart contract time if the contractor does not complete the punch list work within 14 calendar days of the City Engineer issuing the written punch list. The City Engineer and contractor may mutually agree to extend this 14-day requirement.
  - ii. Punch list documents include whatever contract required documentation is missing. The City Engineer may restart contract time if the contractor does not submit the punch list documents within



14 calendar days of the City Engineer issuing the written punch list. The City Engineer and contractor may mutually agree to extend this 14-day requirement.

3. Proceed as specified in 502.19.2.A until the City Engineer determines that the work is complete.

D. Complete

1. The project is complete when the contractor has completed all contract bid items, change order work, and punch list work including the submission of all documentation.

### 502.19.3 Final Payment and Acceptance

Whenever, in the opinion of the City Engineer, the Contractor shall have completed the work in an acceptable manner and in accordance with the terms of the contract, the City Engineer shall make a final inspection of the work, and upon completion of the same, they shall certify to the Board of Public Works in writing as to said completion, and shall further certify as to the entire amount of every class of work performed and as to the value thereof. The Board of Public Works, upon receipt of said certificate, and its own inspection, shall accept the work and approve final payment according to the terms of the Contract. In the event Common Council approval is necessary, the Board of Public Works shall make the required recommendations to the Common Council. Upon acceptance of the work, the Board of Public Works or Common Council shall order final payment to be made and shall notify the Contractor and the Surety of such acceptance. The action by the City and the City Engineer by which the Contractor is to be bound and the contract concluded according to the terms thereof, shall be evidenced by the aforesaid certificate and final payment, all prior certificates or estimates upon which payments may have been made being merely estimates and subject to correction in the final payment. Whenever the term "final acceptance" is used throughout the contract, it shall be interpreted to mean that the requirement of this section shall be complied with.

### 502.20 – MAINTENANCE

The Contractor shall be required to repair at the Contractor's own expense, any faulty material or workmanship and any damage therefrom that may develop within a period of one year after the date of "Final Acceptance." The Contractor shall make such repairs to the entire satisfaction of the City Engineer and the City. The performance bond furnished with this contract shall remain in full force and effect until the expiration of the warranty period, and until any necessary repairs have been made to the entire satisfaction of the City Engineer and the City of Wauwatosa.

## **SECTION 503 - CONTROL OF MATERIAL**

### **503.01 - PLANT INSPECTION**

If the volume, progress of the work and other consideration warrant, the City Engineer may undertake the inspection of materials at the sources of supply. Plant inspection, however, will not be undertaken until the City Engineer is assured of the cooperation and the assistance of both the Contractor and the material producer. The representative of the City shall have free entry at all times to such parts of the plant as concern the manufacture or production of the materials ordered and the material producer shall furnish free of charge all reasonable facilities to assist in determining whether the material furnished meets with the requirements of the specifications. The City assumes no obligation to make the inspection of materials at the source of supply and the responsibility of securing satisfactory materials rests with the Contractor.

The City reserves the right to retest all materials which have been tested and accepted at the source of supply after the same have been delivered and to reject all materials which when retested do not meet with the requirements of the specifications.

The Contractor shall give sufficient notification of the placing or orders for materials to permit testing.

### **503.02 - SAMPLES AND TESTS**

The Contractor shall provide such facilities as the City Engineer may require for collecting and forwarding samples, and shall not make use of or incorporate in the work any material represented by these samples until the tests have been made and the material found to be acceptable in accordance with the requirements of the specifications. The Contractor shall furnish without charge all samples required.

When required by the City Engineer, representative preliminary samples of the character and quality prescribed shall be submitted by the Contractor or producer for examination and shall be tested in accordance with the methods referred to herein. The acceptance of preliminary sample, however, shall not be construed as acceptance of the material from the same source delivered later. Only the materials actually delivered for the work will be considered and their acceptance or rejection will be based solely on the results of the tests prescribed in these specifications. All samples shall be submitted before shipment of the material to the site of the work and in ample time to permit making tests or examinations before incorporating the material into the work.

All tests shall be made in accordance with the methods described in these specifications. If any specifications are inadvertently omitted, those of the A.S.T.M. or other recognized societies for such materials will be used. References to A.S.T.M. or other recognized societies, specifications shall be understood to mean the latest revision of the standard specifications. Laboratory tests shall be made by a recognized laboratory acceptable to

the City Engineer. Reports of tests provided by the Contractor shall be submitted promptly to the City Engineer.

The Contractor shall give timely notice to the City Engineer of the place and time of the test to be made, to permit the City Engineer to witness the test if they should so desire. All tests shall be made at the sole expense of the Contractor.

#### 503.03 - STORAGE OF MATERIALS, EQUIPMENT AND VEHICLES

Materials shall be so stored as to insure the preservation of their quality and fitness for the work. Stored materials, even though approved before storage, shall be inspected prior to their use in the work and shall meet the requirements of the specifications at the time it is proposed to use them. Stored materials shall be located so as to facilitate prompt inspection. That portion of the public streets or public lands not required for public use or travel may upon approval of the City Engineer be used for storage purposes and for placing of the Contractor's plant and equipment, however, adequate storage space is not guaranteed and, additional space, if required, shall be provided by the Contractor at their own expense.

The Contractor's vehicles, equipment and materials shall not be left on the street except when work operations are actually in progress, unless otherwise authorized by the City Engineer.

#### 503.04 - DEFECTIVE MATERIALS

All materials not conforming to the requirements of these specifications shall be considered as defective, and all such materials, whether in place or not, shall be rejected and shall be removed immediately from the work by the Contractor at the Contractor's expense, unless otherwise permitted by the City Engineer. No rejected materials, the defects of which have been subsequently corrected, shall be used until approval has been given. Upon failure on the part of the Contractor to immediately comply with any order of the City Engineer relative to the provisions of this article, the City Engineer shall have the authority to remove and replace such defective material and to deduct the cost of removal and replacement from any monies due or which may become due the Contractor.

## **SECTION 504 - LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC**

### **504.01 - LAWS TO BE OBSERVED**

The Contractor shall at all times observe and comply with all laws, ordinances and regulations which in any manner affect the conduct of the work, and all such orders or decrees as exist at the present or which may be enacted later by bodies or tribunals having jurisdiction or authority over the work, and no plea of misunderstanding or ignorance thereof will be deemed an excuse or the cause of the Contractor sustaining damages by reason of the Contractor acting at their own peril due to such misunderstanding or ignorance. Contractor shall indemnify and save harmless the City and all its officers, agents, employees and servants against any claim or liability arising from or based on the violation of any law, ordinance, regulation, order or decree whether by the Contractor or the Contractor's employees.

Vehicles hauling materials used in or about the work or the movement of vehicles or equipment over any public highway or street to the project, necessary for the prosecution of the work, shall be regulated in accordance with the provisions of all laws, ordinances and regulations.

All scaffolding, walkways, runways, hoists and other temporary constructions shall comply with all pertinent requirements of all laws, ordinances and regulations.

### **504.02 - PERMITS AND LICENSES**

The Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices necessary and incidental to the due and lawful prosecution of the work.

### **504.03 - PATENTED DEVICES - MATERIALS AND PROCESSES**

It is mutually understood and agreed that without exception contract prices are to include all royalties and costs arising from patents, trademarks and copyrights in any way involved in the work. It is the intent that whenever the Contractor is required or desires to use any design, device, material or process covered by letters, patent or copyright, the right for such use shall be provided for by suitable legal agreement with the patentee or owners and copy of this agreement shall be filed with the City Clerk and a copy with the City Engineer, however, whether or not such agreement is made or filed as noted, the Contractor and the surety in all cases shall indemnify and save harmless the City from any and all claims for infringement by reasons of the use of any such patented design, device, material or process to be performed under the contract, and shall indemnify the said City for any losses, costs, expenses, damages, or judgments which it may be obliged to pay, by reason of any such infringement at any time during the prosecution or after the completion of the work.

#### 504.04 - SANITARY PROVISIONS

The Contractor and/or the Contractor's subcontractor's shall provide and maintain in a neat and sanitary condition such accommodation for their employees as may be necessary to comply with the requirements and regulations of the Wisconsin State Board of Health, City Ordinances, or of other authorities having jurisdiction, and shall commit no public nuisance.

#### 504.05 - USE OF EXPLOSIVES

When the use of explosives is necessary for the prosecution of the work, the Contractor shall observe the utmost care not to endanger life and property. The Contractor shall not use explosives in the course of their work without the approval of the Board of Public Works and/or the City Engineer.

All blasting operations must conform to the State of Wisconsin Statutes, Wisconsin Industrial Commission Orders and City of Wauwatosa regulations therefore.

#### 504.06 - PROTECTION AND RESTORATION OF PROPERTY

The Contractor shall use every precaution to prevent damage or destruction of corporate or private property. The Contractor shall notify, in writing, the owners of all corporate or private property that interferes with the work and shall arrange with them for the disposition of such property. Contractor shall protect and carefully preserve all property marks until the City Engineer has witnessed or otherwise referenced the location or relocation.

The Contractor shall notify within reasonable time all corporate or private property owners and their lessees of any work to be undertaken by the Contractor which will be in close proximity to and which may cause damage to any footings, foundations, or any substructures, and advise all such owners and their lessees that they should take all necessary measures to fortify same.

The Contractor shall be responsible for the damage or destruction of property of any character resulting from neglect, misconduct or omission in the manner or the method of execution or the partial or complete failure in execution of the work or caused by defective work or the use of unsatisfactory materials, and such responsibility shall not be released until the work shall have been completed and the requirements of these specifications complied with.

Wherever public or private property is damaged or destroyed, the Contractor shall, at their own expense, restore such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, rebuilding or replacing it as may be directed, or Contractor shall otherwise make good such damage or destruction in an acceptable manner. If Contractor fails to do so, the City Engineer may, after the expiration of a period of forty-eight (48) hours after giving notice to the Contractor in writing, proceed

to repair, rebuild or otherwise restore such property as may be deemed necessary and deduct the cost of such restoration from the compensation due or which may become due the Contractor under this contract.

#### 504.07 - INDEMNIFICATION

Contractor shall indemnify, save harmless, and defend Owner and City Engineer against any and all lawsuits, claims, demands, liabilities, losses and expenses, including attorneys' fees and administrative expenses, that may arise, or be alleged to have arisen, out of or in connection with Contractor's, or its subcontractors' or Suppliers', performance of, or failure to perform, the work or any part thereof, whether or not due or claimed to be done in whole or in part to the active, passive, or concurrent negligence or fault of Contractor, except to the extent caused by the sole negligence of Owner, including, without limitation lawsuits, claims, demands, liabilities, losses, and expenses for or on account of:

1. Any delays or interference or damage to other Contractors; and
2. Labor equipment, materials, or supplies furnished under this Contract, including all liens or notices of liens on account thereof or Contractor's failure to remove or discharge same; and
3. Contractor's failure to obtain any required permits, licenses, approvals, or authorizations; and
4. Bodily injury, sickness, disease, or death sustained by any Person or Persons or injury or damage to, or loss or destruction of, any property; and
5. Any act or omission of Contractor or any of its subcontractors or Suppliers, including but not limited to any failure to fulfill the terms of, or comply with, any laws or to pay any taxes, contributions, or premiums; and
6. Infringement, alleged infringement, or use of patent rights in connection with the work and the use by Owner of any equipment, materials, supplies, processes, or inventions furnished under this contract.

As much of the money due the said Contractor under and by virtue of this contract as shall be considered necessary by the City for indemnification purposes may be retained for the use of the City; or in case no money is due, the Contractor's surety shall be held until such suit or suits, action or actions, claim or claims, judgment or judgments, for injuries or damages as aforesaid shall have been settled or satisfied and suitable evidence to that effect furnished to the City.

The City shall not be liable to the Contractor for damages or delays resulting from work by third parties or by injunctions or other restraining orders obtained by third parties.

The Contractor agrees to pay, and guarantees the payment of, all claims for labor performed and materials furnished, used or consumed in making the improvement or performing the work herein provided for, without limitation, together with premiums for workmen's compensation, all as provided and required by Section 779.14 of the Wisconsin Statutes.

The Contractor, under these specifications, shall carry liability insurance to indemnify the City and the public for injuries sustained by reason of the carrying on of the work. The Contractor shall furnish evidence that they have complied with Chapter 102, Wisconsin Statutes.

#### 504.08 - CONTRACTOR'S RESPONSIBILITY FOR WORK

The work shall be under the charge and care of the Contractor until final acceptance by the Common Council. The Contractor shall assume all responsibility for injury or damage to the work by action of the elements or for any cause whatsoever, whether arising from the execution or partial or complete failure in execution of the work. The Contractor shall rebuild, restore and make good, at their own expense, all injuries or damages to any portion of the work occasioned by any causes before its completion and acceptance.

#### 504.09 - PERSONAL LIABILITY OF PUBLIC OFFICIALS

In carrying out any of the provisions of this contract or in exercising any power or authority granted to the Contractor hereby, there shall be no personal liability upon the City Engineer or their authorized assistants, it being understood that in such matters they act as agents and representatives of the City.

#### 504.10 - NO WAIVER OF LEGAL RIGHTS

The City shall not be precluded or estopped by any measurements, estimate or certificate made either before or after the completion and acceptance of the work and payment therefore, from showing the true amount and character of the work performed and materials furnished by the Contractor, or from showing that any measurement, estimate or certificate is untrue or incorrectly made, or that the work or materials do not conform in fact to the contract. The City shall not be precluded or estopped, notwithstanding any such measurement, estimate, certificate and payment in accordance therewith, from recovering from the Contractor and their sureties such damage as it may sustain by reasons of the Contractor's failure to comply with the terms of the contract. Neither the acceptance by the Board of Public Works, nor any representative of the Board of Public Works, nor any payment for or acceptance of the whole or any part of the work, nor any extension of time, nor any possession taken by the City shall operate as a waiver of any portion of the contract or of any power herein reserved, or any right to damages herein provided. A waiver of breach of the contract shall not be held to be a waiver of any other or subsequent breach.

#### 504.11 - COVENANT AGAINST CONTINGENT FEES

The Contractor warrants that they have not employed any person to solicit or secure this contract upon any agreement for a commission, percentage, brokerage or contingent fees. Breach of this warranty shall give the City the right to terminate the contract, or in its discretion to deduct from the contract price or consideration the amount of such

commission, percentage, brokerage or contingent fees. This warranty shall not apply to commission payable to Contractors upon contracts or sales secured or made through bona fide established commercial or selling agencies maintained by the Contractor for purposes of securing business.

#### 504.12 - OFFICIALS NOT TO BENEFIT

No member of the Public Body shall be admitted to any share or part of this contract or to any benefit that may arise therefrom but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

#### 504.13 - OTHER CONTRACTS

The owner may award other contracts for additional work and the Contractor shall fully cooperate with such Contractors and carefully fit work within the contract including additional work added to the contract to that provided under other contracts as may be directed by the City. The Contractor shall not commit or permit any act that will interfere with the performance of work by any other Contractor.

#### 504.14 - PUBLIC CONVENIENCE AND SAFETY

After the contract has been executed, the Contractor shall notify the City Engineer, at the earliest possible date, of the starting of any construction work which might in any way inconvenience or adversely impact traffic, so that arrangements may be made, if necessary, for closing the street or alley and providing detours. No street shall be closed to the public except by express permission of the City Engineer. The Contractor shall at all times conduct the work in such a manner as to insure the least obstruction to traffic. The convenience of the general public and of residents along the street or alley shall be provided for in an adequate and satisfactory manner. Temporary bridges for pedestrians shall be provided as required, over new pavement, sidewalks or excavations at all street or alley intersections.

The Contractor shall contact the Fire and Police Departments at least seventy two (72) hours with advance notice in writing before it becomes necessary to close a street or part of a street.

Fire hydrants shall be accessible at all times to the Fire Department. No material or obstructions shall be placed closer to a fire hydrant than ten (10) feet.

The Contractor shall give notice in writing to the proper authorities in charge of streets, gas and water pipes, sewer mains, electric or other conduits, railroad, poles, manholes, catch basins, and all other property that may be affected by the Contractor's operation, at least seventy-two (72) hours before breaking ground. The Contractor shall not hinder or interfere with any persons in the protection of such work or in the operation of utilities at any time except with permission of the City Engineer. The Contractor shall protect such utilities from any injury and shall avoid all unnecessary exposure so they will not



cause injury to the public. In case of damage, the cost of making repairs will be charged to the Contractor.

#### 504.15 - BARRICADES AND WARNING SIGNS

When any section of the street is closed or partially obstructed to the use of traffic, the Contractor shall provide and erect at each end of the closed street and at all intersecting streets or at the place where the street is partially obstructed to the use of traffic, substantial barricades of a design approved by the City Engineer, and shall place at the same points warning signs in conformance with the Manual on Uniform Traffic Control Devices (MUTCD) and Wisconsin MUTCD Supplement. The Contractor shall also furnish and place on or adjacent to the barricades, lights and other adequate warning devices to protect the work properly and to provide for the safety and convenience of the traveling public at night. The Contractor shall maintain constantly such barricades, signs and lights from the date of closing of the street or obstruction in the street until such time as, in the judgment of the City Engineer, they are no longer necessary.

When all traffic is to be maintained over the street during the construction, the Contractor shall provide and maintain such barricades, signs, lights and security guards as may be necessary to protect the work properly and to provide for safe and convenient public travel.

If, during the progress of the work, it is necessary to provide access to private property along the street, the Contractor shall provide and maintain within the closed portion of the street such barricades, signs and lights as may be necessary to protect the work and to safeguard the local traffic.

Whenever any section of the street is opened to traffic before all work on that section is completed, or while construction operations are being conducted thereon, the Contractor shall place and maintain at each end of the section and at all points of possible danger, suitable signs warning the public of such construction operations.

The Contractor will be held responsible for all damages to the work due to failure of barricades, signs, lights and security guards to protect it whenever evidence of such damage is found prior to acceptance. The City Engineer may order the damaged portion immediately removed and replaced by the Contractor without cost to the City if, in their opinion, such action is justified. The Contractor's responsibility for the maintenance of barricades, signs and lights shall not cease until project shall have been accepted, and in the event the Contractor shall fail or neglect to maintain all such necessary barricades, signs and lights, the City shall maintain same at the expense of the Contractor and the City shall withhold such expense from the compensation due the Contractor.

#### 504.16 - CONTRACT SECURITY

A. Performance Bond The Contractor shall execute a performance bond on the form provided herein in an amount at least equal to 100% of the full contract price, such bond

to be executed by a surety company acceptable to the City. The performance bond shall serve as security for the faithful performance of this contract. In the event the surety takes over the work and project under the contract, the surety shall be bound by all the provisions of the contract.

B. Labor and Material Bond The Contractor shall furnish a surety bond in an amount at least equal to 100% of the full contract price, such bond to be executed by a surety company acceptable to the City. The labor and material bond shall serve as security for the payment of all persons performing labor and all persons furnishing materials in connection with this contract.

C. Premium Payment The premiums on the performance bond and labor and material bond shall be paid by the Contractor.

D. All bonding companies and sureties issuing bonds and/or contract security shall be licensed to perform business in the State of Wisconsin.

#### 504.17 - CONTRACTOR'S INSURANCE

The Contractor and the Contractor's insurance company shall be held responsible for and shall save the City harmless from all liability for damages occasioned by the digging up, use or occupancy of the street, alley, highway, public grounds and private grounds, or which may result therefrom, or which may result in any way from the negligence or carelessness of the Contractor, their agents, employees or workmen; or by reason of the elements, unforeseen or unusual difficulties, obstructions, or obstacles encountered in the prosecution of the work; and they shall indemnify the City for and save it harmless from all claims and liabilities, actions and causes of action, and liens for materials furnished or labor performed in the construction or execution of the work, and from all costs, charges and expenses incurred in defending such suits or actions, and from and against all claims and liabilities for injury or damage to persons or property emanating from defective or careless work methods, or from and against all claims or liabilities for royalties, license fees, actions, suits, charges and expenses or damage from infringement for reason of the use of any invention or improvement in tools, equipment or plant or any process, device or combination of devices used in the construction of the work.

The Contractor shall not commence work under a contract until they have obtained all insurance required under this paragraph and has filed certificates thereof with the City, nor shall the Contractor allow a subcontractor to commence work until all similar insurance required has been so obtained and filed. Contractor shall be required to maintain insurance throughout the duration of the contract until final acceptance of the project.

A. WORKMEN'S COMPENSATION INSURANCE Statutory coverage as required by Chapter 102 of the Statutes of the State of Wisconsin, as revised, and all acts amendatory thereof and supplementary thereto, and for all employees of the Contractor. All subcontractors and suppliers shall furnish to the Contractor and the City evidence of

similar insurance for all of their respective employees unless such employees are covered by the protection afforded by the Contractor.

## B. COMPREHENSIVE GENERAL LIABILITY AND PROPERTY DAMAGE INSURANCE

### (1) COMPREHENSIVE GENERAL LIABILITY

The Contractor shall maintain during the life of this Contract, Comprehensive General Liability written in comprehensive form to protect the Contractor, the Owner and City Engineer against all claims arising from injuries to members of the public or damage to property of others arising out of any act or omission of the Contractor or their agents, employees, or subcontractors. The policy shall be endorsed to include Notice of Cancellation Endorsement Form IL-7002 10-90 or equivalent endorsement language which is approved by the City Attorney. This endorsement shall be specifically reflected on the Certificate of Insurance form required by Section 504.18, *infra*, and a copy of said endorsement shall be provided to the City when available. In addition, this policy shall specifically insure the contractual liability assumed by the Contract.

The scope of this coverage shall also include the Personal Injury Hazards, including "a", "b", and "c". "a" includes false arrest, malicious prosecution, and un-willful detention or imprisonment. "b" includes libel, slander, and defamation of character. "c" includes wrongful eviction, invasion of privacy and wrongful entry. Employee exclusion shall be removed. In addition, coverage will include broad form property damage, host liquor liability, advertising injury, additional persons insured, extended bodily injury, and incidental medical malpractice.

Comprehensive general liability coverage shall contain no exclusions for explosion, collapse, or underground work (X, C, or U).

The contractor shall also provide completed operation and product liability coverage for the life of the Contract and maintain such coverage for a period of 1 year after final acceptance of the work by the Owner.

The liability limits shall not be less than \$1,000,000 combined single limit per occurrence for personal injury, bodily injury and property damage if coverage written on 1973 I.S.O. form or \$1,000,000. combined single limit per occurrence with \$2,000,000. aggregate for personal injury, bodily injury or property damage if coverage is written on 1986 I.S.O. coverage form.

### (2) UMBRELLA/EXCESS LIABILITY

The Contractor shall maintain during the life of this Contract, Umbrella/Excess Liability coverage totaling \$5,000,000. If primary comprehensive General Liability is written on a 1986 I.S.O. coverage form, Umbrella/Excess liability shall include a drop down provision to protect, on a primary basis, the contractor, the Owner and City Engineer, in the case of exhaustion of the aggregate primary limits.

### C. COMPREHENSIVE AUTOMOBILE LIABILITY AND PROPERTY DAMAGE

Operations of owner, hired and non-owned motor vehicles.

Bodily Injury .....	\$500,000 per person \$1,000,000 per occurrence
Property Damage .....	\$500,000 per occurrence

The Contractor shall file with the City a certification of insurance containing a ten (10) day notice of cancellation.

NOTE: The required limits of liabilities may be obtained with primary liability policies or in combination with an umbrella excess third party liability policy.

D. ADDITIONAL INSURED All insurance coverages required pursuant to this contract shall name the following persons as additional insured parties:

The City and its boards, commissions, committees, authorities, employees, agencies and officers, voluntary associations, other units operating under the jurisdiction and within the appointment of its budget.

### 504.18 - PROOF OF CARRIAGE OF INSURANCE

The Contractor shall furnish the City with satisfactory proof of carriage of the insurance required on the Certificate of Insurance form attached hereto. Insurance coverage shall be maintained throughout the duration of the project.

### 504.19 – DEBARMENT CERTIFICATION

The Contractor certifies that, neither the Contractor firm nor any owner, partner, director, officer, or principal of the Contractor, nor any person in a position with management responsibility or responsibility for the administration of federal funds:

A. Is presently debarred, suspended, proposed for debarment, and declared ineligible or voluntarily excluded from covered transactions by any federal or state department/agency;

B. Has within a three-year period preceding this certification been convicted of or had a civil judgment rendered against it for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public transaction or contract (federal, state, or local); violation of federal or state antitrust statutes; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

C. Is presently indicted for or otherwise criminally or civilly charged by a governmental entity (federal, state, or local) with commission of any of the offenses enumerated in paragraph B above; or

D. Has within a three-year period preceding this certification had one or more public transactions or contracts (federal, state, or local) terminated for cause or default.

The Contractor further certifies that it shall not knowingly enter into any transaction with any subcontractor, material supplier, or vendor who is debarred, suspended, declared ineligible, or voluntarily excluded from covered transactions by any federal or state department/agency.

#### 504.20 - CONTRACTOR'S WARRANTIES

In consideration of, and to induce the award of this Contract, the Contractor represents and warrants:

- (a) That the Contractor is not in arrears to the city upon debt or contract, and that Contractor is not a defaulter, as surety, Contractor, or otherwise.
- (b) That Contractor is financially solvent and sufficiently experienced and competent to perform the work.
- (c) That the work can be performed as called for by the contract.
- (d) That the facts stated in the Contractor's proposal and the information given by the Contractor are true and correct in all respects.
- (e) That Contractor is fully informed regarding all the conditions affecting the work to be done and labor and materials to be furnished for the completion of this contract, and that the information was secured by personal investigation and research.

#### 504.21 - COMPLIANCE WITH SECTION 71.80(16)

If Section 71.80(16) Wisconsin Statutes is applicable, Contractor hereby agrees to comply with the requirements of such Section. This Section is applicable to Contractors who are nonresidents of Wisconsin when total contract price exceeds \$50,000.00.

#### 504.22 - FINAL GUARANTY

All work shall be and is guaranteed for a period of one year from and after the date of final acceptance of all the work by the Common Council. If, within said guaranty period, repairs or changes are required in connection with the guaranteed work, for any reason, unless the City Engineer determines that the cause is not that of the Contractor, the

Contractor shall promptly, upon receipt of notice from the city, and without expense to the City, place such guaranteed work in satisfactory condition, correct all defects therein, make good all damage to the structure or site, or contents thereof, which damage, in the opinion of the City Engineer, results from the use of such inferior substandard or defective materials, equipment, or workmanship not in accordance with the Contract. The Contractor shall also repair, replace or correct any damage to the buildings, or structure, or to the contents of the building or site as a result of fulfilling any such guarantee.

If within ten (10) days after notice the Contractor fails to comply with the terms of any warranty or guaranty herein contained, the City may have the defects corrected, and the Contractor and their Surety shall be liable for all expense incurred; provided, however, that in case, in the opinion of the City Engineer, delay would cause serious loss or damage, repairs may be made by the City without notice being given to the Contractor, and the Contractor shall pay the cost thereof.

All special guarantees or warranties applicable to specific parts of the work as may be stipulated in the Contract Specifications or other papers forming a part of this Contract shall be subject to the terms of this paragraph during the first year of the life of such guaranty. All special guarantees and manufacturers' warranties shall be delivered to the City Engineer before checking of Shop Drawings on Items of Major Equipment and other items before acceptance of the work.

## **SECTION 505 - PROSECUTION AND PROGRESS**

### **505.01 - PROSECUTION OF THE WORK**

The Contractor shall begin the work within ten (10) days after the date of the City Engineer' notice to the Contractor of the final execution of the Contract and order to the Contractor to proceed with the work. The Contractor shall notify the City Engineer in writing within forty-eight (48) hours before starting the work of the Contractor's intention to do so. The Contractor shall, on a weekday basis, continuously pursue completion of the work. The Contractor shall not suspend work for any reason other than inclement weather or other condition beyond the Contractor's direct control, and shall resume work within 24 hours of the ceasing of inclement weather.

### **505.02 - ADDITIONAL SECURITY**

Should any surety upon the bond for performance of this contract become unacceptable to the City, the Contractor must promptly furnish such additional security as may be provided from time to time to protect the interests of the City and of persons supplying labor or materials in the prosecution of the work contemplated by this contract.

### **505.03 - CHARACTER OF WORKMEN AND EQUIPMENT**

The Contractor shall employ such superintendents, foremen, and workers as are careful and competent. If any persons employed on the work by the Contractor shall be found by the City Engineer to be incompetent or negligent in the performance of their duties or neglects or refuses to comply with directions given, employee shall be discharged immediately on the written requests of the City Engineer, and such persons shall not again be reemployed on the work. Should the Contractor continue to employ such person or persons, the City Engineer may suspend the work until such orders are complied with.

All machinery and equipment used by the Contractor on the work shall be of sufficient size and in such mechanical condition as to meet with the requirements of the work and to produce a satisfactory quality of work.

When so ordered by the City Engineer in writing, unsatisfactory equipment shall be removed and replaced with equipment that will satisfactorily perform the work. Failure of the Contractor to provide adequate equipment may result in the default of the contract.

The Contractor shall at all times have a competent superintendent capable of reading and thoroughly understanding the plans and specifications, as their agent on the work, who shall receive instructions from the City Engineer or their authorized representatives. The Superintendent shall have full authority to execute the orders or directions of the City Engineer without delay and to supply promptly such materials, tools, plant equipment and labor as may be required.

### **505.04 – ADVERSE WEATHER**

- (1) The engineer will award a time extension for severe weather on calendar day and completion date contracts. Submit a request for severe weather days if the number of adverse weather days, as defined in 101.3, exceeds the anticipated number of adverse weather days tabulated below.

<b>TOTAL ANTICIPATED ADVERSE WEATHER DAYS FOR EACH CALENDAR MONTH</b>							
Jan: 31 <sup>[1]</sup>	Feb: 28 <sup>[1]</sup>	Mar: 31 <sup>[1]</sup>	April: 5	May: 4	June: 4	July: 3	Aug: 3
Sep: 4	Oct: 5	Nov 1 thru 15: 2	Nov 16 thru 30: 15 <sup>[1]</sup>		Dec: 31 <sup>[1]</sup>		

<sup>[1]</sup>Includes an anticipated winter suspension from November 16 through March 31.

- (2) Submit the request to the engineer at the end of the month. Indicate the number of adverse weather days that occurred during that month. Provide progress schedule documentation to show that the controlling item of work was delayed. Show that the delay was beyond the control of the contractor. The engineer will assess the contractor's submittal and indicate how many adverse weather days are confirmed.
- (3) For each calendar month, the engineer will grant a severe weather day for each confirmed adverse weather day that exceeds the number of anticipated adverse weather days. When the contractor requests severe weather days, the engineer will give the contractor a monthly written statement showing the number of days credited for severe weather. At the end of the project, the engineer will extend time on calendar day and completion date contracts for the cumulative number of severe weather days credited each month.

#### 505.05 - TEMPORARY SUSPENSION OF WORK

The City Engineer shall have authority to suspend the work wholly or in part for such period or periods as they may deem necessary, due to unsuitable weather or such conditions as are considered unfavorable for the suitable prosecution of the work or for such time as it is necessary due to the failure on the part of the Contractor to carry out orders given or perform any and all provisions of the contract.

#### 505.06 - EXTENSION OF CONTRACT TIME FOR COMPLETION

The time for completion of the work contemplated will be as herein specified and it is understood that the completion of the work within the time specified is an essential part of this contract.

The contract time shall start on the date of the City Engineer's notice to the Contractor to proceed with the work.

If the Contractor finds it is impossible to complete the work on or before the time specified for completion, they may make written request for extension of time. Contractor shall set forth fully in their request the reasons the Contractor believes justify the granting of their request.



If the City finds that the work was delayed because of conditions beyond the control of the Contractor, or that the quantities of work done or to be done are in excess of the estimated quantities by an amount sufficient to warrant additional time, it may grant an extension of time for completion as appears reasonable and proper. The extended time for completion shall then be considered as in full force and effect as if it were the original time for completion.

#### 505.07 - FAILURE TO COMPLETE WORK ON TIME

Should the Contractor or the Surety fail to complete the work within the time agreed upon or within such extra time as may be allowed by extensions, there shall be deducted from any monies due or that may become due the Contractor or Surety the sum set forth in the official notice to Contractors for each and every calendar day, including Sundays and holidays, that the work shall remain incomplete. This sum shall be considered and treated not as a penalty but as a fixed, agreed and liquidated damages due the City from the Contractor or Surety by reason of inconvenience to the public, added cost of Engineering and supervision and other items which have caused an expenditure of public funds resulting from the Contractor's failure to complete the work within the time specified.

Permitting the Contractor or Surety to continue and finish the work or any part of it after the time fixed for its completion, or after the date to which the time for completion may have been extended, shall in no way operate as a waiver on the part of the City of any of its rights under the contract.

#### 505.08 - LIMITATION OF OPERATIONS

The Contractor shall conduct the work so as to create a minimum amount of inconvenience to vehicular and foot traffic. At any time when, in the judgment of the City Engineer the Contractor has obstructed or closed, or is carrying on operations on a greater portion of the street than is necessary for the proper prosecution of the work, the City Engineer may require the Contractor to finish the sections on which work is in progress before work is started on any additional section.

#### 505.09 - WORK HOUR RESTRICTIONS

Work operations in residential areas, including daily startup activities under this contract, shall be limited to the period from 7 A.M. to 7 P.M. Monday thru Friday, during the life of the contract except those work operations identified in the special provisions, if any. If, in the opinion of the City Engineer, or their authorized representative, unusual circumstances dictate work outside of these hours is warranted due to an emergency condition, or special circumstance, such authorization by the City Engineer or their representative to extend the working hours beyond those stated herein, shall be given in writing and, if authorized, shall be on a single incidence basis for a specific day. For all other work that is not deemed an unusual circumstance, the Contractor shall follow the

procedures outlined in section 605.1.07 of the specifications to obtain written permission to perform work.

#### 505.010 - SUBSTANCE ABUSE PREVENTION PROGRAM

The contractor shall develop, implement and maintain a Substance Abuse Prevention Program as established by Section 103.503 of the Wisconsin State Statutes, and all acts amendatory thereof and supplementary thereto. This statute establishes certain prohibitions against the use and distribution of drugs and alcohol by employees of contractors and subcontractors that have been awarded contracts for or are performing work on public works projects subject to Wisconsin's prevailing wage requirements.

The program must cover all union and non-union employees who work on the Owner's construction sites. Failure to implement such a program prior to award shall result in the Bidder being held to be non-responsible. Following award of the Contract if the Contractor breaches the District Policy by failing to have or to effectively implement the policy, the Owner shall consider this a breach of the Contract by the Contractor and may terminate the Contract. This requirement shall be applicable to all subcontractors with subcontracts in excess of one percent (1%) of the bid.

The act specifically provides that effective May 1, 2007, contractors, subcontractors and their respective employees must comply with the following requirements:

1. Employees on covered public works projects are prohibited from (a) using, possessing, attempting to possess, distributing, delivering or being under the influence of drugs while performing work on covered public works projects, and (b) using or being under the influence of alcohol while performing work on covered public works projects.
2. Before a contractor or subcontractor begins a covered public works project, the contractor or subcontractor must have a written program for the prevention of substance abuse, including:
  - (a) A prohibition against the use of drugs or alcohol while working on covered public works projects.
  - (b) A requirement that contractor's or subcontractor's employees submit to random, reasonable suspicion and post-accident drug and alcohol tests.
  - (c) A requirement that contractor's and subcontractor's employees submit to drug and alcohol tests before beginning work on covered public works projects, unless those employees have been participating in a random testing program during the preceding 90 days.
  - (d) A procedure for notifying employees that fail a test or refuse to submit to testing that they may not perform work on covered public works projects until they submit to and pass drug and alcohol tests.

3. Each contractor and subcontractor is required to pay for the development, implementation and enforcement of its own substance abuse program. These costs cannot be passed on to covered public works projects.
4. Contractors and subcontractors cannot allow employees that fail a test or refuse to submit to substance abuse tests to work on covered public works projects.
5. All substance abuse testing must be conducted in accordance with guidelines for laboratory testing procedures and chain of custody procedures established by the Substance Abuse and Mental Health Services Administration of the Federal Department of Health and Human Services.

## **SECTION 506**

- (a) CITY The City of Wauwatosa, Wisconsin, the Owner of the work, represented by its duly constituted Common Council.
- (b) BOARD OF PUBLIC WORKS The duly constituted Board of Public Works of the City of Wauwatosa, Wisconsin.
- (c) CITY ENGINEER The City Engineer of the City of Wauwatosa, Wisconsin, or their duly authorized representative.
- (d) INSPECTOR The authorized representative of the Engineer assigned to make detailed inspection of any or all portions of the work or material therefore.
- (e) OFFICIAL NOTICE TO BIDDERS The official notice inviting bids for the proposed work.
- (f) WORK The contemplated improvement covered by the Contract.
- (g) EXTRA WORK Work other than that required either expressed or implied by the Contract in its present form.
- (h) BIDDER Any individual, firm or corporation submitting a proposal for the work contemplated, acting directly or through a duly authorized representative.
- (i) PLANS All official drawings or reproductions of drawings pertaining to the work provided for in the Contract.
- (j) SPECIFICATIONS The body of directions, provisions and requirements contained herein, together with written agreements and all documents of any description, made or to be made pertaining to the method or manner of performing the work, or the quality of materials to be furnished under the Contract.
- (k) ADDENDUM OR ADDENDA Any additional contract provisions issued in writing by the City prior to the receipt of bids.
- (l) GENERAL CONDITIONS SECTION 500 The special body of directions, provisions and requirements prepared to cover the proposed work on the Project. General Conditions Section 500 shall govern the work and shall take precedence over the other Contract Documents wherever they conflict therewith.
- (m) PROPOSAL The written offer of the bidder to perform the work proposed.
- (n) PROPOSAL GUARANTY The security designated in the proposal furnished by the bidder, as a guaranty of good faith to enter into a contract with the Owner for constructing the work, if it be awarded to the bidder.
- (o) AWARD The decision of the City to accept the proposal of the lowest responsible bidder and to let by contract the work to such bidder, subject to a satisfactory contract therefore and bond to secure the performance thereof being executed by and between

such bidder and the City and approved by the City, and further subject to all other conditions as may be specified or otherwise required by law relating to the work and contract being complied with and fulfilled.

(p) CONTRACTOR The individual, firm or corporation undertaking the execution of the work under the terms of the contract and acting directly or through a duly authorized representative.

(q) SUBCONTRACTOR A person, firm or corporation other than a Contractor, supplying labor and materials or labor at the site of the project.

(r) PROJECT The entire public improvement proposed by the City to be constructed in part or in whole pursuant to the written contract.

(s) WORK ON PROJECT Work to be performed, including work normally done, at the location of the Project.

(t) CONTRACT The written agreement covering the performance of the work and furnishing of materials for the construction of the project. The contract includes the official notice to Contractors, proposals, performance bond, bid bond, specifications, general and detailed plans, supplemental agreements, general conditions and special conditions, and other paper pertaining to the work or materials therefore, all referred to as the Contract Documents.

(u) CONTRACT BOND The approved form of security furnished by the Contractor and their surety as a guarantee of good faith and ability on the part of the Contractor to execute the work in accordance with the terms of the Contract.

(v) SURETY The corporate body bound with and for the Contractor to insure the Contractor's acceptable performance of the Contract and for the Contractor's payment of all obligations pertaining to the work.

(w) A.S.T.M. The American Society for Testing Materials.

(x) A.A.S.H.T.O. The American Association of State Highway and Transportation Officials

Any provisions of the contract documents which may be in conflict or inconsistent with any of the foregoing paragraphs in the General Conditions, Section 500, shall be void to the extent of such confliction or inconsistency.

**SECTION 600**  
**SPECIAL PROVISIONS**

**CONTRACT 23-07**

These Special Provisions cover items, correction, deletions or additions to the General Contract Conditions, the Standard Specs, the State Specs, and the City Provisions, and take precedence over those other parts of those specifications which are in conflict herewith.

200.03 - **TIME OF SUBSTANTIAL COMPLETION** The substantial completion date for Contract 23-07 N. 115<sup>TH</sup> STREET IMPROVEMENTS shall be October 13, 2023.

There will be no other extension of time and no extenuating circumstances, except perhaps an industry strike, or the inability of the City to receive plan and specification approval.

If the contractor does not complete the work on or before the date set forth above for CONTRACT 23-07 N. 115<sup>TH</sup> STREET IMPROVEMENTS or within the extra time allowed under a City Engineer granted time extension, the City will assess liquidated damages. The City will deduct one thousand five hundred seventy dollars (\$1,570.00) for every calendar day that the work remains uncompleted from payments due the contractor. An entire calendar day will be assessed for any period of time within a calendar day that the work is not substantially complete beyond 12:01am.

**CONSTRUCTION PHASING REQUIREMENTS**

All work in Potter Road shall be substantially complete by August 18, 2023. Substantially complete shall be as defined in Section 502.19.3. If this work is not complete by August 18, 2023, the City of Wauwatosa will assess liquidated damages. The City will deduct one thousand five hundred seventy dollars (\$1,570.00) for per calendar day that the work remains uncompleted from payments due the contractor. An entire calendar day will be assessed for any period of time within a calendar day that the work is not substantially complete beyond 12:01am.

**505.01 – PROSECUTION OF THE WORK**

The Contractor shall begin the work within ten (10) days after the date of the Engineer's notice to the Contractor of the final execution of the Contract and order to the Contractor to proceed with the work. The Contractor shall notify the Engineer in writing within forty-eight (48) hours before starting the work of his intention to do so.

The Contractor shall work continuously and make substantial progress each day until the project is complete. Work days are defined as Monday through Friday (excluding inclement weather days and holidays). Suitable days shall be

determined by the Engineer. **A sum of \$900 for each suitable day on which no substantial work or progress is completed shall be deducted from any monies due to the Contractor.** Substantial progress will be determined with the City in discussions with the Contractor.

#### 506 - DEFINITIONS

Director of Public Works and City Engineer may be used interchangeably within these Specifications but have the same authority and meaning.

#### 600.1.01 – HOLIDAY WORK RESTRICTIONS

The contractor may petition the Board of Public Works for approval of work hours outside of 7am-7pm or Sunday work. Petitions for work outside of permitted hours must be made on the Board of Public Works Application form attached at the end of these special provisions. Applications must be received by the application deadline shown on the form and must include all necessary supporting documentation required by the application. The application fee shall be waived for all extension of work hour requests for work being performed under city construction contracts. Submit completed applications via email to Nicholas Deming [ndeming@wauwatosa.net](mailto:ndeming@wauwatosa.net) and Mary Boettcher [mboettcher@wauwatosa.net](mailto:mboettcher@wauwatosa.net)

#### **Holiday Work Restrictions:**

Do not perform work on the project during the following holiday periods:

- Monday, May 29, 2023, for Memorial Day
- Monday, June 19, 2023, for Juneteenth
- Tuesday, July 4, 2023 for Independence Day
- Monday, September 4, 2023, for Labor Day

#### 600.1.02 - PLANS AND SPECIFICATIONS

A general description of the work along with the locations is contained in the Instructions to Bidders - Section 200. The plans for the construction of this project consist of 88 sheets with the file numbers 16-994, 30-811, 41-996, 15-1075, and 23-275.

#### 600.1.03 UTILITY COORDINATION

It is anticipated that We-Energies Gas will be performing utility relocation work within the project limits. The Contractor is responsible to coordinate his work with the utility relocates to ensure no delays are encountered.

#### 600.1.04 – PROGRESS MEETINGS

The Contractor shall schedule and administer weekly progress meetings for the purpose of coordinating schedules and expediting the work. Meetings will be held at the Wauwatosa City Hall, located at 7725 W. North Avenue, Wauwatosa, WI.

Attendance Required: All job superintendents, major Subcontractors, and Suppliers, Engineer, owner, as appropriate to topics for each meeting.

The agenda will include, but not be limited to, the following:

1. Review of work progress.
2. 3 week look ahead schedule
3. Field observations, problems and decisions.
4. Identification of problems which impede planned progress.
5. Corrective measures to regain progress schedule.
6. Other business related work.

#### 600.1.05 – SANITARY LATERAL INVESTIGATION AND TELEVISIONING

Sanitary lateral television inspection reports prepared by Visu Sewer are included in the Appendix of this project manual. The lateral inspection reports are for information only.

#### 620.3.D – Quality Control

*Replace paragraph 3 with the following:*

The testing shall include density testing of in-place HMA pavement with the use of nuclear density gauges. Section 460 of the State Specs shall be modified by these specifications to require the Contractor to test for nuclear density a minimum of every 300 feet. The Contractor shall perform HMA pavement density testing with nuclear gauges operated by a Nuclear Technician I who has been certified by the Highway Technician Certification Program. The Contractor shall furnish nuclear gauges from the current "Wisconsin Department of Transportation List of Approved Nuclear Density/Moisture Gauges."



## **SECTION 601**

### **MEASUREMENT AND PAYMENT**

The bid price for each bid item shall include the furnishing of all materials, tools, labor, etc. It shall include excavation, disposition of surplus material, pipe laying, backfilling, surface replacement, sheeting, shoring, tunneling, augering, dewatering, furnishing and installing of fittings, connecting to existing manholes, restoration of public or private property disturbed or damaged by the Contractor's operation and cleanup, all as specified.

The item numbers referred to below correspond to the numerical portion of the number in the proposal. Contractor shall refer to the items below, the plans and the specifications for details of the work included.

#### **DIVISION A – SANITARY SEWER**

##### **ITEM A2-18 – LATERAL T-LINER AT CONNECTION, 8"x6", 12 FT LENGTH**

- A. Description: The unit bid and contract price shall include all labor, materials, tools, and equipment necessary for full installation of a lateral t-liner at the lateral connection to the main, including preparatory cleaning, TV inspection before and after rehabilitation along with reports and video tapes, bypass pumping of sewage, clearing all obstructions, reinstatement of active service laterals (where applicable), providing openings at all manholes unless otherwise specified (where applicable), and testing. Lateral t-liners shall fully seal all portions of the wye, tee, or other fitting or tap which connects the lateral to the mainline sewer. Installation and materials shall be in accordance with NASSCO "Cured-In-Place-Pipe (CIPP) Lateral Seals" specifications except as noted herein. T-liner shall overlap the joint(s) of the mainline edges of the connection fitting to the main by a minimum of 1-inch. "Top-hat" style liners are NOT acceptable. Liner shall extend a minimum of 12 LF up the lateral from the connection at the main.
- B. Method of Measurement and Basis of Payment: To be paid per each lateral t-liner acceptably completed, as determined and measured by the Engineer. No segment of lateral t-liner work shall be paid for until after the work is completed and televised. Any work necessary to perform lateral t-liner installation, including but not limited to cleaning, jetting, and/or removal of obstructions in the mainline, shall be incidental to this item.

##### **ITEM A5-02 –PRO-RING CHIMNEY REBUILD**

- A. Description: The unit bid price for this item shall include all labor, material, equipment, and tools necessary for rebuilding chimney, and shall include the removal and rebuilding of a chimney section on a per foot basis (0.1 ft.).  
The

contractor shall use new Cretex Pro-Ring adjusting rings system to bring the casting to the proper grade and slope, installation of the new casting(s) and grate(s) on top of the adjusting rings. Surface restoration shall be included in Bid Item ???. Manhole frames and covers will be supplied by the City.

- B. Method of Measurement and Basis of Payment: Manhole Rebuild with Pro-Ring chimney shall be measured per vertical foot to the nearest 0.1 feet of new manhole structure and chimney installed (excluding the new frame), and paid at the unit price bid per each vertical foot of manhole and chimney acceptably rebuilt, as measured and determined by the Engineer.

#### ITEM A5-03 –REBUILD SANITARY MANHOLE

- A. Description: The unit bid price for this item shall include all labor, material, equipment, and tools necessary for removal of the existing or new frame, grate, adjusting rings, damaged areas of cone and/or barrel, repairing or rebuilding of the cone, barrel, or bench, the cleaning and surface preparation of the structure prior to chimney installation, new Cretex Pro-Ring adjusting rings system to bring the casting to the proper grade and slope, installation of the new casting(s) and grate(s) on top of the adjusting rings, and surface restoration (where applicable). Contractor shall have materials for cone/chimney/bench repairs or reconstructions approved in writing by the Engineer as part of their pre-construction submittals. See Section 616 of these specifications for details on Pro-Rings and their installation. Manhole frames and covers will be supplied by the City.
- B. Method of Measurement and Basis of Payment: Manhole Rebuild with Pro-Ring chimney shall be measured per vertical foot to the nearest 0.1 feet of new manhole structure and chimney installed (excluding the new frame), and paid at the unit price bid per each vertical foot of manhole and chimney acceptably rebuilt, as measured and determined by the Engineer.

#### ITEM A5-04 – REPLACE FRAME AND COVER, EX. SAN. MH'S, CITY SUPPLIED

- A. Description: The unit bid price for this item shall include all labor, materials, equipment, and tools necessary for the removal and installation of a new sanitary manhole frame and cover, as furnished by the City of Wauwatosa, including but not limited to salvaging of the existing frame and cover to the City of Wauwatosa Department of Public Works.
- B. Method of Measurement and Basis of Payment: Replace frame and cover shall be measured and paid per each frame and cover acceptably replaced and salvaged to the City, as confirmed by the Engineer. Frames and covers installed as part of a complete manhole rebuild shall NOT be paid under this item.

## **DIVISION B – WATER MAIN**

### **ITEM B3-06 – ABANDON WATER VALVE VAULT**

- A. Description: The unit bid price for this item shall include all labor, materials, equipment, and tools necessary to abandon a water valve vault. Abandonment shall include removing a minimum of 3 ft of the brick/block valve vault and the existing frame and grate, salvaged for the City. Installation of valve box and cover and surface restoration as noted on plans.
- B. Method of Measurement and Basis of Payment: To be paid per each water valve vault abandoned.

### **ITEM B3-11 – 24" WATER MAIN BUTTERFLY VALVE**

- A. Description: Butterfly valves shall include all labor, material, equipment, and tools necessary for overhead tree removal and trimming as required, pavement saw cutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, cutting and removal of active water main pipe to facilitate valve installation, removal of incidental manhole structures and ductbank that are inactive, installation of butterfly valve, installation of connecting water main pipe(s), masonry support blocking, connection fittings and sleeves, valve box adaptor, valve box, corrosion protection including but not limited to bitumastic type coatings and polyethylene bagging, designated joint restraints, concrete buttresses, insulation for frost protection, backfill as noted on the plan or as directed by the Engineer, and surface replacement where noted on drawings.
- B. Method of Measurement and Basis of Payment: Butterfly valve spot replacement shall be paid for at the unit price bid per each for the various types and sizes of butterfly valves installed on existing water mains, including as incidental, but not limited to, the length of mainline pipe installed for reconnection and any fittings and/or sleeves used during installation. Payment for butterfly valve spot repairs will be based on the actual number acceptably installed, as measured and determined by the Engineer.

## **DIVISION C – STORM SEWER**

### **ITEMS C1-34 through C1-124– STORM SEWER**

- A. Description: Storm sewer shall include all labor, materials, and equipment necessary for tree removal and trimming as required, pavement saw cutting and removal and/or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive or will be inactive after completion of the installation of the proposed sewer, removal of incidental manhole structures and ductbank that are

inactive or will be inactive after completion of the installation of the proposed sewer, pipe installation including, but not limited to, pipe bedding and pipe cover material in the pipe zone, backfill as noted on the plan (mechanically compacted spoil, mechanically compacted crushed concrete or slurry), and permanent surface restoration where noted on drawings.

In addition, the Contractor shall expose any utility crossings at locations of possible conflict, as shown on the plans, prior to commencing pipe laying so either the utilities can be altered or the line and grade of the proposed relay can be adjusted. Electric and communication poles, pedestals, traffic signals, conduit, and cable shall be protected and supported as necessary to install piping. This work shall be incidental to the bid item(s).

- B. Method of Measurement and Basis of Payment: Storm sewers shall be paid at the unit price bid per lineal foot measured horizontally, measured horizontally from center-to-center of structures, or to the limits of the existing pipe remaining, whichever is applicable, for the various classes, types, backfill and sizes of pipe installed. Payment for pipe shall be based on the actual number of feet acceptably installed, as determined and measured by the Engineer.

#### ITEMS C3-01 through C3-02 – STORM MANHOLE

- A. Description: Storm manholes shall include all labor, materials, and equipment necessary for overhead tree removal and trimming as required, pavement saw cutting and removal and/or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping and/or structures that are inactive or will become inactive after completion of the installation of the proposed sewer, removal of incidental manhole structures and ductbank that are inactive or will become inactive after completion of the installation of the proposed sewer, all necessary bypass pumping, structure installation including, but not limited to, base, riser and cone, concrete bench, watertight connections at all incoming and outgoing sewers, stubs, steps, backfill as noted on the plan (mechanically compacted spoil, mechanically compacted crushed concrete or slurry), and surface replacement where noted on drawings. Frames and covers shall be provided by the City.
- B. Method of Measurement and Basis of Payment: Storm manholes shall be paid at the unit price bid per lineal foot measured vertically, from the flow line of the outgoing sewer to the top of the manhole casting frame and cover after final pavement or lawn restoration, for the various types, backfill, and sizes of manhole installed. Payment for manholes shall be based on the actual number of vertical feet acceptably installed, as determined and measured by the Engineer.

## ITEM C21 & C22 – CONNECTION TO EXISTING STORM SEWER OR MANHOLE

- A. Description: Connections to existing storm sewers shall include all labor, material and equipment necessary for overhead tree removal and trimming as required, pavement sawcutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and ductbank that are inactive, temporary plugs, installation of sleeves between new storm sewer and existing storm sewer, mechanically compacted spoil or crushed concrete backfill and compaction, and surface replacement where noted on drawings.
- B. Basis of Payment: Connections to existing storm sewers shall be paid for at the unit price bid per each for the various types and sizes of connections installed. Payment for connections to existing storm sewers will be based on the actual number installed, as determined and measured by the Engineer.

## ITEMS C3-24 through C3-34 – CATCH BASINS and INLETS

Description: Precast storm catch basin and inlet structure installation.

Materials: As specified in Section 610.1.05. Frame and grate as shown on plans. Frames, back boxes and grates shall be provided by the City.

Construction: Storm catch basin and inlet structures shall include all labor, materials, and equipment necessary for overhead tree removal and trimming as required, pavement saw cutting and removal and/or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping and/or structures that are inactive or will become inactive after completion of the installation of the proposed sewer, removal of incidental manhole structures and ductbank that are inactive or will become inactive after completion of the installation of the proposed sewer, all necessary bypass pumping, structure installation including, but not limited to, base, riser and cone, concrete bench, watertight connections at all incoming and outgoing sewers, stubs, steps, backfill as noted on the plan (mechanically compacted spoil, mechanically compacted crushed concrete or slurry), and surface replacement where noted on drawings. Frames, back boxes and grates shall be provided by the City.

Method of Measurement: Storm catch basin and inlet structures shall be measured per each installed.

Basis of Payment: Storm catch basin and inlet structures shall be paid at the unit price bid per each for the various types and sizes of catch basins installed. Payment for storm catch basin and inlet structures will be based on the actual number installed, as measured by the Engineer.

## ITEMS C3--61 – SLOTTED VANE DRAIN, 15-inch, 3LF Sections

- A. Description: Gravity storm sewer with slotted vane drain installation, diameter as noted.
- B. Materials: As noted.

Pipe and end cap shall be polyvinyl chloride (PVC), SDR35 as specified in Section 610.1.02

The slotted vane drain shall be made from cast iron in accordance with AASHTO Designation M-111 and connected to the PVC pipe by use of 16 gage tie wire. Slotted vane drain shall be Neenah R-3599-B or approved equal.

Lean grout backfill material shall be fine aggregate in accordance with Sections 501.2.5 Aggregates and 501.3.6 Site-Mixed Concrete of the Wisconsin Department of Transportation Standard Specifications, latest edition. The mix design shall consist of 150 pounds of cement and approximately 30 gallons of water for each 3,000 pounds of fine aggregate.

All concrete for curb and gutter shall be in accordance with Section 620 General Provisions for Grading and Paving. Delete all references to Part 7 of the State Specs.

- C. Construction: Slotted vane drain shall include all labor, material and equipment necessary for tree removal and trimming as required, pavement sawcutting and removal or lawn removal, excavation, removal and disposal of excess soil material, drain installation including crushed aggregate bedding, lean grout backfill, 3-foot section of slotted vane drain pipe, concrete curb and gutter, mechanically compacted spoil or crushed concrete backfill and compaction.
- D. Method of Measurement: Slotted vane drains will be measured horizontally in 3-foot pipe increments.
- E. Basis of Payment: Slotted vane drains shall be paid for at the unit price bid per each 3-foot section of drain installed. Payment for drain will be based on the actual number of sections installed, as measured by the City.

#### ITEM C4-05 – LATERAL CORE CONNECTION TO EXISTING OR NEW STORM SEWER

- A. Description: Connect new storm piping to existing or new storm sewer
- B. Materials: As specified on plans
- C. Construction: Core connections shall include all labor, material and equipment necessary for overhead tree removal and trimming as required, pavement sawcutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and ductbank

that are inactive, temporary plugs, core-drill of existing or new storm sewer, installation of sleeves between new storm piping and existing or new storm sewer, mechanically compacted spoil or crushed concrete backfill and compaction, and surface replacement where noted on drawings.

- D. Method of Measurement: Core connections for new storm piping to existing or new storm sewers will be measured for each new cored connection installed.
- E. Basis of Payment: Cored connections to new storm sewers shall be paid for at the unit price bid per each for the various types and sizes of cored connections installed. Payment for cored connections to new storm sewers will be based on the actual number installed, as measured by the City of Wauwatosa.

#### ITEM C4-01 and C4-04 – CONNECTION TO EXISTING STORM SEWER OR MANHOLE

- A. Description: Connections to existing storm sewers shall include all labor, material and equipment necessary for overhead tree removal and trimming as required, pavement sawcutting and removal or lawn removal, excavation, removal and disposal of excess soil material, removal of incidental sewer and water main piping that is inactive, removal of incidental manhole structures and ductbank that are inactive, temporary plugs, installation of sleeves between new storm sewer and existing storm sewer, mechanically compacted spoil or crushed concrete backfill and compaction, and surface replacement where noted on drawings.
- B. Basis of Payment: Connections to existing storm sewers shall be paid for at the unit price bid per each for the various types and sizes of connections installed. Payment for connections to existing storm sewers will be based on the actual number installed, as determined and measured by the Engineer.

#### ITEM C5-16 – TUCKPOINTING CHIMNEY OR BRICK MANHOLE

- A. Description: The unit bid price for this item shall include all labor, materials, equipment, and tools necessary for tuckpointing existing chimneys or deteriorated brick spots, including but not limited to the removal of an existing internal seal, and the removal and disposal of any loose brick, mortar, or other debris from the tuckpointing area.
- B. Method of Measurement and Basis of Payment: Tuckpointing chimney or brick manhole shall be measured per each manhole in which the work is acceptably completed, as measured and confirmed by the Engineer.

#### ITEM C5-05 AND C5-06 – STORM SEWER ABANDONMENT OR REMOVAL

Description: Abandonment or removal of existing storm sewer main

Materials: Pipe filling with approved grouting material such as Elastizell PS120, or equal.

Construction: Storm sewer abandonment or removal shall include all labor, material and equipment necessary to abandon existing storm sewers by filling with approved grouting material, including bulkheads; or to entirely remove storm sewer.

Method of Measurement: Storm sewer abandonment or removal will be measured horizontally from pipe end or bulkhead to pipe end or bulkhead.

Basis of Payment: Storm sewer abandonment or removal shall be paid for at the unit price bid per lineal foot measured horizontally for the various classes, types, backfill and sizes of pipe abandoned or removed. Payment for pipe will be based on the actual number of feet abandoned or removed, as measured by the City of Wauwatosa.

#### ITEMS C36 & C37 – REMOVE OR ABANDON STORM SEWER MANHOLE

Description: Removal or abandonment of existing storm manhole

Materials: Fill as specified in Section 610.1.02 D.

Construction: Storm manhole removal or abandonment shall include all labor, materials and equipment necessary to remove or abandon existing storm manhole in accordance with the City Specs.

Method of Measurement: Storm manhole removal or abandonment shall be measured per each storm manhole removed or abandoned.

Basis of Payment: Storm manhole removal or abandonment shall be paid for at the unit price bid per each storm manhole removed or abandoned for the various classes, types, backfill, and sizes of storm inlet abandoned. Payment for removal or abandonment shall be based on the actual number removed or abandoned, as measured by the Engineer.

#### ITEM C5-13 – REPLACE FRAME AND COVER, EX. STORM MH'S, CITY SUPPLIED

A. Description: The unit bid price for this item shall include all labor, materials, equipment, and tools necessary for the removal and installation of a new storm manhole frame and cover, as furnished by the City of Wauwatosa, including but not limited to salvaging of the existing frame and cover to the City of Wauwatosa Department of Public Works.

B. Method of Measurement and Basis of Payment: Replace frame and cover shall be measured and paid per each frame and cover acceptably replaced and salvaged to the City, as confirmed by the Engineer. Frames and covers installed as part of a complete manhole rebuild shall NOT be paid under this item.



## **DIVISION D – PAVING**

### **Item D1-10 – Pulverize and Relay Asphalt Pavement, 12-1/2" INCH Depth**

Description This section describes full depth in-place pulverizing of the existing asphaltic pavement along with a portion of the underlying base and relaying the pulverized material to construct a new base.

Materials (Vacant)

Construction Construct according to section 325.1 of the state specs except all materials must be removed from the project and delivered to the City of Wauwatosa, Department of Public Works Yard, 11100 W Walnut Rd, Wauwatosa, WI 53226

Measurement The City will measure Pulverize and Relay Asphalt Pavement by the square yard acceptably completed.

Payment Pulverize and Relay Asphalt Pavement as measured above, is full compensation for Payment is full compensation for pulverizing, windrowing, relaying, adding water, shaping, and compacting.

### **Item D1-12 – Milling Driveways**

Description: This provision describes milling existing drive approaches

Materials: (Vacant)

Construction: Remove the existing pavement by milling at all drive approaches abutting the asphalt paving where the curb flange is to be overlain. Mill as necessary to maintain the curb flow line across the drive approach. Remove the existing pavement without incorporating or damaging the underlying material to remain in place. Provide a uniform milled surface that is reasonably plane, free of large scarification marks, and has the grade and transverse slope the plans show or the engineer directs.

Use a self-propelled milling machine with depth, grade, and slope controls. Shroud the drum to prevent discharging loosened material into the adjacent work areas or live traffic lanes. Provide an engineer-approved dust control system. Maintain one lane of traffic during working hours. Unless a continuous removal and pick-up operation, do not windrow or store material on the roadway. Clear the roadway of materials and equipment during none working hours. Grade shoulders adjacent to milled areas by the end of each work day to provide positive drainage of the pavement. Do not allow abrupt longitudinal differences of 2 inches or more between lanes during non-working hours. The engineer may waive one or more of these requirements if the highway is closed to traffic or if a particular operation does not endanger traffic.

Measurement: The City will measure Milling Driveways by each location acceptably completed.

Payment: Milling Driveways as measured above is full compensation for milling the existing pavement, hauling, and disposing of all removed material within the limits the plans show and the engineer directs.

#### **Item D1-14 – Milling Transition to Curb and Gutter Overlay**

Description This provision describes milling curb and gutter at the beginning and end of sections where an asphalt overlay is to be placed on the curb and gutter.

Materials (Vacant)

Construction Remove the existing pavement by milling at the location and to the depth the plans show. Notify the engineer immediately if the existing pavement thickness does not match that shown in the plans.

Remove the existing pavement without incorporating or damaging the underlying material to remain in place. Provide a uniform milled surface that is reasonably plane, free of large scarification marks, and has the grade and transverse slope the plans show or the engineer directs.

Use a self-propelled milling machine with depth, grade, and slope controls. Shroud the drum to prevent discharging loosened material into the adjacent work areas or live traffic lanes. Provide an engineer-approved dust control system. Maintain one lane of traffic during working hours. Unless a continuous removal and pick-up operation, do not windrow or store material on the roadway. Clear the roadway of materials and equipment during none working hours. Grade shoulders adjacent to milled areas by the end of each work day to provide positive drainage of the pavement. Do not allow abrupt longitudinal differences of 2 inches or more between lanes during non-working hours. The engineer may waive one or more of these requirements if the highway is closed to traffic or if a particular operation does not endanger traffic.

Measurement The City will measure Milling Transition to Curb and Gutter Overlay by the linear foot acceptably completed.

Payment Milling Transition to Curb and Gutter Overlay as measured above is full compensation for milling the existing pavement, hauling, and disposing of all removed material within the limits the plans show and the engineer directs.

#### **Item D1-15 – Removing Concrete Pavement**

Description This provision describes removing and disposing of concrete pavement.

Materials (Vacant)

Construction Remove and dispose of concrete pavement including all surfaces or other pavements superimposed on it and

Measurement The City will measure Removing Concrete Pavement by the square yard acceptably completed. The City will measure the removal of concrete curb and gutter in conjunction with the removal of concrete pavement by the square yard acceptably completed under the removing concrete pavement item.

Payment Removing Concrete Pavement as measured above, is full compensation for sawcutting, removing, and disposing concrete pavement to the limits the plans show or as the engineer directs.

**Item D1-16 – Removing Curb and Gutter**

Description This provision describes removing and disposing of concrete curb and gutter.

Materials (Vacant)

Construction Remove and dispose of concrete curb and gutter including all surfaces or other pavements superimposed on it.

Measurement The City will measure Removing Curb and Gutter by the linear foot acceptably completed.

Payment Removing Curb and Gutter as measured above, is full compensation for sawcutting, removing, and disposing concrete curb and gutter to the limits the plans show or as the engineer directs.

**Item D1-04 – Base Aggregate Dense 1 ¼-Inch**

Description This provision describes furnishing and placing Base Aggregate Dense 1 ¼-Inch in accordance with Section 620.

Materials Furnish Materials in accordance with Section 620 for Base Aggregate Dense 1 ¼-Inch.

Construction Construct Base Aggregate Dense 1 ¼-Inch in accordance with Section 620.

Measurement The City will measure Base Aggregate Dense 1 ¼-Inch by the ton acceptably completed. The contractor shall provide copies of the Base Aggregate Dense weight receipts to the engineer at the end of each day.

Payment Base Aggregate Dense 1 ¼-Inch as measured above, is full compensation for providing material; hauling; and placing to the limits the plans show or as the engineer directs.

**Item D2-05 – 31” Concrete Curb and Gutter**

**Item D2-05 – 31” Concrete Curb and Gutter (Intersection)**

Description This provision describes furnishing: all materials, equipment, tools, labor and incidentals necessary for the construction of concrete curb and gutter at locations as shown on the Contract Drawings and directed by the Engineer.

Materials The grade and class of all concrete used shall conform to Grade A or Grade A-FA of said State Specs so that a minimum compressive strength of 3600 pounds per square inch is developed in 28 days of curing (Grade A2 may be used for sidewalks). Other grades may be used with the approval of the Engineer. The use of a water reducing admixture is subject to Section 501 of the State Specs.

Construction Curb & gutter construction shall conform to section 601 of the State Specs. The surface of curb and gutter construction shall be finished by troweling and brushing.

Construct 31” Concrete Curb and Gutter and 31” Concrete Curb and Gutter (Intersections) in accordance with the construction details shown in the plans. 31” Concrete Curb and Gutter (Spot locations) shall be constructed to the cross-section shown for 31” Concrete Curb and Gutter.

Honeycombing occurring along the back of the curb and the flange face shall be pointed with mortar (1 part Portland Cement to three parts Fine Aggregate) after removal of the forms. All excess concrete behind the curb shall be removed before backfilling.

Tie new work to existing concrete pavement using tie bars driven or epoxied into the existing concrete.

Measurement The City will measure 31” Concrete Curb and Gutter by the linear foot measured along the flow line acceptably completed. No deduction will be made for inlet grates within the new curb and gutter.

Payment 31” Concrete Curb and Gutter items as measured above, are full compensation for special construction required at driveways, alleys, and curb ramps; for providing materials, including concrete, expansion joints; for placing, finishing, protecting, and curing; for sawing joints; and restoring the worksite. The City will pay for 31” Concrete Curb and Gutter 50 linear feet or less as 31” Concrete Curb and Gutter (Spot Locations). All tie bars required for construction of this item shall be incidental.

### **Items D3-17 – Joint and Crack Repair**

Description: This provision describes joint and crack repair involving removing all loose or spalled concrete and asphaltic patching, cleaning the joints and cracks, and filling with asphaltic material and compacting HMA.

Materials: Furnish Hot Mixed Asphalt meeting the requirements of Section 460 of the state specs for HMA Pavement 5 MT 58-28 S; the engineer will not require the contractor to conform to the quality management program specified under Section 460.2.8 of the state specs.

Construction: Clean out all joints and cracks. Place asphaltic tack coat. Fill voids with the new asphaltic mixture and compact.

Measurement: The City will measure Joint and Crack Repair by the linear foot acceptably completed.

Payment: Joint and Crack Repair as measured above is full compensation for removing and properly disposing of all loose or spalled concrete and asphaltic patching; for cleaning the joints and cracks; for furnishing and placing tack coat, for furnishing HMA pavement and filling joints and cracks with HMA pavement; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the work.

Asphaltic material, asphaltic mixture, and tack coat used to fill the joint will be incidental to the completed work.

### **Items D3-18 – Asphaltic Driveway (Remove and Replace), HMA Pavement 4 MT 58-28 S**

Description This provision describes providing labor and materials in accordance with Section 620 and the state specs.

Materials Furnish materials in accordance with Section 620 except furnish HMA Pavement meeting the requirements of Section 460 of the state specs for HMA Pavement 4 MT 58-28 S.

Construction Construct in accordance with Section 620 for asphalt pavement construction.

Measurement The City will measure Asphaltic Driveway by the SY acceptably completed.

Payment Asphaltic Driveway as measured above, is full compensation for materials, cleaning, sweeping and providing tack coat on previously placed asphalt, and placing asphalt pavement to the lines, grades, and thicknesses shown on the plans.

#### **Item D4-04 – 8” Concrete Pavement**

Description This provision describes providing labor and materials in accordance with Section 620.

Materials All concrete shall be in accordance with Section 620 General Provisions for Grading and Paving.

Construction Construction shall be in accordance with Section 620.

Measurement The City will measure 8” Concrete Pavement by the square yard acceptably completed.

Payment 8” Concrete Pavement as measured above, is full compensation for placing, finishing, protecting, and curing concrete

#### **Items D4-20, D4-24, D4-27 – HMA Pavement 3 MT 58-28 S, HMA Pavement 4 MT 58-28 S, Utility Trench Restoration**

Description This provision describes providing labor and materials in accordance with Section 620 and the state specs.

Materials Furnish materials in accordance with Section 620 except furnish HMA Pavement meeting the requirements of Section 460 of the state specs for HMA pavement 3 MT 58-28 S, and HMA Pavement 4 MT 58-28 S.

Construction Construct in accordance with Section 620 for asphalt pavement construction.

Measurement The City will measure HMA Pavement bid items by the ton acceptably completed.

Payment HMA Pavement Bid items as measured above, are full compensation for materials, cleaning, sweeping and providing tack coat on previously placed asphalt, and placing asphalt pavement to the lines, grades, and thicknesses shown on the plans.

#### **Item D3-07, D3-03 – 5” Concrete Sidewalk, 7” Concrete Sidewalk, 7” Concrete Drive Approach**

Description This provision describes providing all materials, equipment, tools, labor and incidentals necessary to construct 5-inch concrete walks and 7-inch concrete walks, and 7” concrete drive approaches as shown on the Contract Drawings and directed by the Engineer.

Materials Furnish material in accordance with Section 620 General Provisions for Grading and Paving.

Construction Construction shall be in accordance with Section 620. The slope across the walk shall be 1.5% unless otherwise directed or shown on the plans. The surface of sidewalk construction shall be finished by troweling and brushing, and sidewalks shall be 5 feet wide unless otherwise noted or directed by the Engineer. Concrete sidewalk and concrete drive approaches must be constructed on Base Aggregate Dense 1 ¼-Inch as shown in the plans. Base Aggregate Dense 1 ¼-inch for sidewalk and drive approaches will be paid for separately under the applicable bid item.

Measurement The City will measure Concrete Sidewalk and Concrete Drive Approach bid items by the square foot acceptably completed.

Payment Concrete Sidewalk and Concrete Drive Approach bid items as measured above, are full compensation for placing, finishing, protecting, and curing concrete.

### **Items D3-10 – Detectable Warning Field**

Description Work under this item includes the installation of Detectable Warning Fields at the curb ramp as shown on the plans.

Materials Furnish cast iron detectable warning fields for curb ramps with a natural patina finish.

Construction Embed detectable warning fields in plastic concrete conforming to manufacturer-recommended procedures. Do not install on hardened concrete.

Measurement The City will measure Detectable Warning Field by the square foot acceptably completed

Payment Detectable Warning Field as measured above, is full compensation for providing the Detectable Warning Field with a natural patina finish.

### **Item D7-01 – Adjusting Water Valve**

The unit bid and contract per each price for this item shall include all labor, tools, and materials required for the adjustment of existing water valve boxes to match new and replacement pavement and sidewalk

### **Items D7-05 –Adjusting Inlet/Catchbasin, Adjusting Storm Manhole, Adjusting Water Manhole**

The unit bid and contract per each price for this item shall include all labor, tools, and materials required for the removal of existing frame and grate, adjustment rings, cleaning and surface preparation of the structure, and the furnishing and installing, including mortar, of adjustment rings for chimney

rehabilitation of structure frames to the proper grade and slope as shown on the Contract Drawings or as directed by the Engineer.



**Items D6-15, D6-37 – Marking Epoxy 4-Inch Line (White), Marking Epoxy 4-Inch Line (Yellow)**

Description This provision describes furnishing materials and installing 4-inch epoxy pavement marking lines.

Materials Furnish Materials conforming to Section 646.2 of the state specs for Epoxy Pavement markings.

Construction Construct in accordance with Section 646.3 of the state specs for epoxy pavement markings and the construction details.

Measurement The City will measure Marking Epoxy 4-Inch Line bid items by the linear foot of line acceptably completed.

Payment Marking Epoxy 4-Inch Line bid items as measured above is full compensation for furnishing materials and placing the markings.

**Item D6-20 – Marking Stop Line 18-Inch Epoxy**

Description This provision describes furnishing materials and installing epoxy stop line markings.

Materials Furnish Materials conforming to Section 646.2 of the state specs for Epoxy Pavement markings.

Construction Construct in accordance with Section 646.3 of the state specs for epoxy pavement markings and the construction details.

Measurement The City will measure Marking Stop Line 18-Inch Epoxy by the linear foot of line acceptably completed.

Payment Marking Stop Line 18-Inch Epoxy as measured above is full compensation for furnishing materials and placing the markings.

**Item D6-39 – Marking Crosswalk Transverse Line 12-Inch Epoxy**

Description This provision describes furnishing materials and installing epoxy transverse crosswalk markings.

Materials Furnish Materials conforming to Section 646.2 of the state specs for Epoxy Pavement markings.

Construction Construct in accordance with Section 646.3 of the state specs for epoxy pavement markings and the construction details.

Measurement The City will measure Marking Crosswalk Transverse Line 12-Inch Epoxy by the linear foot of line acceptably completed.

Payment Marking Crosswalk Transverse Line 12-Inch Epoxy as measured above is full compensation for furnishing materials and placing the markings.

#### **Item D6-43 – Marking Raised Intersection Arrow Epoxy**

Description This provision describes furnishing materials and installing epoxy Raised Intersection Arrow pavement markings

Materials Furnish Materials conforming to Section 646.2 of the state specs for Epoxy Pavement markings.

Construction Construct in accordance with Section 646.3 of the state specs for epoxy pavement markings and the construction details.

Measurement The City will measure Marking Raised Intersection Arrow Epoxy by each marking acceptably completed.

Payment Marking Raised Intersection Arrow Epoxy as measured above is full compensation for furnishing materials and placing the markings.

#### **Item D6-44 – Marking Continental Crosswalk Epoxy**

Description This provision describes furnishing materials and installing epoxy continental crosswalk markings.

Materials Furnish Materials conforming to Section 646.2 of the state specs for Epoxy Pavement markings.

Construction Construct in accordance with Section 646.3 of the state specs for epoxy pavement markings and the construction details.

Measurement The City will measure Marking Continental Crosswalk Epoxy by each Continental Crosswalk marking acceptably completed.

Payment Marking Continental Crosswalk Epoxy as measured above is full compensation for furnishing materials and placing the markings.

#### **Item D5-02 – Topsoil and Sod**

Description This provision describes furnishing and placing topsoil and sod at the locations the plan shows and the engineer directs.

Materials Furnish topsoil; bluegrass nursery sod; and Type A granular fertilizer.

Construction Cover the grade with 3 inches of topsoil. Before laying sod, a good butt joint shall be provided in all cases. No scraps of any size will be permitted

for use. All sod must be fertilized with a Type A granular fertilizer; cost to be included in bid prices. To make a tight match with the undisturbed sod, a sod cutter may be used to line up and square up the trench. Sod must be placed to a butt joint and not wedged off with topsoil or laid on top of existing lawn. Sod shall be properly rolled or tamped in place and kept moist.

**All sod must be watered thoroughly each day for thirty (30) consecutive calendar days (excluding Sundays) by the Contractor.**

The Contractor must notify the City when watering on site. In extreme heat, the Contractor must continue watering daily until the sod is accepted as being established by the Engineer. If the Contractor chooses to use City of Wauwatosa water, water may be obtained at the City's Public Works facility at 11100 W. Walnut Road, at the Contractor's expense.

On the last day of the 30 day watering period, the Contractor shall provide written notice to each private property where watering has been completed stating that further watering is the responsibility of the property owner.

Measurement The City will measure Topsoil and Sod by the square foot acceptably completed.

Payment Top Soil and Sod as measured above, is full compensation for furnishing and placing earth fill, topsoil, blue grass nursery sod, and Type-A fertilizer; and watering for 30 days.

#### **Item D6-08: New Sign Post**

Description This work shall consist of the installation of new sign posts with anchors at the locations as shown on the Contract Drawings and as directed by the Engineer.

Materials Sign posts shall be 2" (2-3/8" O.D) x 10' Schedule 40 Aluminum extruded post, mill finish, plain end.

Anchor shall be Tapco V-Loc Steel Breakaway post or approved equal.

Construction The Contractor will be required to install the post anchors flush with the surface.

Method of Measurement The sign post and anchor shall be paid per each installed.

Basis of Payment Sign posts shall be paid for at the unit price per each installed, as measured by the Engineer.

### **Item D6-01 – Traffic Control**

Description: Installation and maintenance of traffic control components for diversion of traffic around the work site.

Materials: As noted on drawings.

Construction: Traffic control shall include all labor, material and equipment necessary for furnishing, maintaining and removing all traffic control devices as show on the plan set. It shall include placing signs, barricades, lights, striping and all other items required by the traffic control plan, any necessary covering and uncovering of signs, and removal of all items when traffic control is no longer necessary.

Method of Measurement: Traffic control will be measured lump sum for labor and materials.

Basis of Payment: Traffic control shall be paid for at 25 percent for the traffic control plan and equipment installed, 50 percent for maintaining traffic control based on the percentage of work completed, and 25 percent for the removal and restoration of the pavement markings, as determined by the City of Wauwatosa.

### **Item D46 – Erosion Control**

The lump sum unit price for temporary and permanent erosion control and storm water management measures shall include full compensation for cost of erosion control implementation plan; furnishing, hauling, and placement of erosion control materials and storm water management materials; cleanup, and all incidental work related to erosion control and storm water management required by local, state, and federal ordinances, statutes, permits, and regulations; not specifically included for payment under any other unit prices.

## **DIVISION E – STREET LIGHTING**

### **E1-01 Locate, Test and Protect Existing and New Circuits**

Description. This work shall start at the notice to proceed and consists of repairing damage to existing circuits, locating existing underground wiring as affected due to work associated with project, testing new equipment, and testing new 600V underground circuit(s).

Materials. (Vacant)

Construction. If there are overhead and underground utility facilities located within the project limits, refer to the plans and specifications for any anticipated utility adjustments.

The Contractor shall coordinate his construction activities with a call to Diggers Hotline or a direct call to the utilities which have facilities in the area as required per statutes (see General Provisions for a detailed list of utility contact information).

Contractor shall be responsible for locating existing underground street lighting and traffic signal cables within the project limits.

Bidders are advised to contact each utility company prior to preparing their bids. Any damage to public or private utilities shall become the responsibility of the Contractor. Satisfactory repair or replacement shall be completed at the Contractor's expense.

Where there is enclosed or unenclosed lighting cable within the project limits, care must be exercised by the Contractor to avoid damage to the cable during work. Where the Contractor or any of his Subcontractors damage any part of the lighting system which results in inoperative street lights or traffic signals, or an outage has occurred anywhere within the project limits, the damage shall be assessed within 24 hours. The damage shall be repaired within 72 hours by a qualified electrician at the Contractor's expense, and in accordance with City specifications. The Contractor shall be responsible to locate and mark facilities that are installed as part of the project until the project is deemed substantially complete and the final as built drawings are turned over to the City Engineer.

Should a reasonable time limit be exceeded, as determined by the Engineer, the City reserves the right to hire a third party, independent of the Contractor, to perform the repair(s). **The cost of hiring a third party and having them repair the damage will be paid for by the Contractor. Contractor agrees they will be informed of the final cost, which will be deducted from monies owed in a subsequent payment.**

In lieu of hiring a third party, the City may also choose to fine the Contractor as they see fit for the circumstances, to be charged each day the lights are not properly functioning outside of Engineer's determined time limit.

Repairs shall be investigated and completed promptly in accordance with City of Wauwatosa specifications (20-inch depth, splices, mason sand envelope, etc.). The City may require temporary repairs at the Contractor's expense, including the installation of overhead facilities, to accelerate the return of functional electrical systems. Backfilling of the curb at repair locations must not be done until all needed repairs have been made and inspected by the City Electrical Supervisor.

When applicable, cable work at existing conduit locations damaged during construction is to be corrected by utilizing newly placed conduit which has been laid as part of the contract work. Frost loops of at least 12 inches shall be provided where cables enter conduit systems. **All buried cable must be enveloped with mason sand.**

The Contractor shall perform acceptance tests for circuits installed under this project and shall record that information on INSULATION AND EQUIPMENT TESTING SCHEDULE after construction is completed. The contractor shall create and provide all documentation to the City at completion of tests (with all system issues corrected).

Testing shall occur in the presence of the Public Works Department personnel. The Contractor and the City shall agree on a time for testing of the completed installation which is generally toward the end of the contract period.

A general system "Test Burn" shall be performed with any failed luminaires being replaced, along with any other non-functioning component. Only one test burn for the purpose of identifying initial failures will be required.

For insulation testing (on new underground conductors): Fuses shall be removed from all fuse holders to not damage LED luminaire drivers during testing. Each conductor (entire length) shall have its insulation tested to ground from the control cabinet. The conductors shall have a reading of infinity, at 1000Vdc impressed voltage to be accepted. If any readings do not meet the infinity requirement, the contractor shall sequentially test each portion (between termination points) of the lighting circuit till the issue(s) can be identified. The issues shall be mitigated by corrections (i.e. tighten lugs) or replacements (i.e. replace defective splices, conductors) - additional splices will NOT be allowed.

If equipment associated with the project does not operate properly or fails the tests as outlined, it is the Contractor's responsibility to determine issues and to correct and/or repair defect at his own expense.

Method of Measurement. Locate, Test, and Protect Existing and New Circuits shall be measured as a single complete unit of work.

Basis of Payment. Locate, Test, and Protect Existing and New Circuits, as measured above, is full compensation for testing, locating and protection of existing and new circuits, repairs, replacement materials; for removals and replacement of all installed materials; and for all labor, equipment, tools and incidentals necessary to complete the work.

## **E1-02 Temporary Lighting**

Description The work under this item shall consist of furnishing and installing temporary wood poles, luminaires/arms and aerial cable to maintain partial

street lighting in areas of construction. Lighting beyond limits of construction shall be maintained as well. This is in addition to any temporary lighting that may already be indicated on the plans.

The contractor is responsible for determining and providing materials as needed to maintain at least partial lighting during construction. The plan shall be submitted to the City for approval.

#### Materials

##### Wood Poles:

Wood poles shall be Class V or larger with a 35' overall length - adjust length as needed to accommodate locations below existing utility poles/lines. The poles shall be northern pine in accordance with ANSI standards 05.1 (specifications and dimensions of wood poles). Pressure treatment shall be 5% pentachlorophenol with a minimum of 8 pounds per cubic foot net retention of the oil-borne preservative.

Down guys shall be galvanized and meet the following requirements:

- (1) Three-eighths (3/8) inch nominal diameter 7-strand, zinc coated steel wire conforming to ASTM A475, 11,500 pounds minimum breaking strength, utilities grade or better.
- (2) A twin eye 5/8-inch nominal diameter anchor rod with a minimum breaking strength of 11,500 pounds.
- (3) An expanding or plate type anchor with an expanded area of 125 square inches or greater. A screw type anchor may be used provided the anchor is 10 inches in diameter, has 78 square inches of area and a rod diameter 1-1/4 inch by 66 inches or larger and galvanized.
- (4) A 7-foot PVC or plastic guy guard.
- (5) Guy wire clamps shall be 3-bolt and have a minimum breaking strength of 11,500 pounds. A galvanized service sleeve shall be used to hold down the loose guy ends beyond the guy clamp.
- (6) The dead-ends shall be made of the same material as the guy wire.
- (7) A guy strain insulator ANSI Class 54-2 tensile strength 12,000 pounds maximum cable diameter of 1/2 inch.

##### Luminaires/Arms:

High pressure sodium or LED cutoff luminaires of appropriate output. Mast arms of appropriate length.

##### Aerial Cable:

The aerial cable shall consist of 2 AWG triplex or quadplex assembly of two or three XLP insulated power aluminum conductors respectively with an ACSR bare messenger wire (for use as ground conductor as needed).

#### Construction

The depth of the wood pole in the ground shall not be less than 5 feet or as directed by the engineer.

Down guys shall be installed on poles that are at the end of an aerial cable run or where aerial cable tension would cause the pole to lean.

The Contractor shall install the overhead lines in a manner which is safe and in accordance with applicable codes, and shall correct excessive sag or loose connections for the length of the contract, or until removal, whichever comes first. The cable shall be a minimum of 20 feet above any roadway surface and 15 feet above other surfaces.

Where necessary to connect to existing underground circuiting, the Contractor shall provide an appropriately sized junction box at the base of the wood pole for an above ground splice. The cable that extends to 10 feet above grade shall be appropriately protected by a plastic cable guard or conduit.

Materials shall be removed immediately after no longer necessary. Holes left after removals shall be backfilled and compacted.

In the event of circuit failures in and near the project area during construction suspected to relate to construction activities, the Contractor, at his expense, shall respond to and troubleshoot outages. Whether or not the problem or solution lies within the project limits, he shall immediately make the necessary repairs per City specifications. The Contractor shall lay out his own work and shall be responsible for determining exact locations for equipment and rough-ins and the exact routing of conduits so as to best fit the layout of his work.

Since damaged cable may not be discovered until non-working hours, the Contractor shall maintain a telephone number by which he can be contacted for said repairs 24 hours/day, 7 days/week, including holidays and weekends. Repairs must be permanent in nature and may include installation of an entire conduit crossing with pull boxes, trenching, cable replacement and other work needed as determined by the City Electrician.

After the Contractor has made sufficient repairs, should the Contractor demonstrate, to the satisfaction of the Engineer, that damage to the underground cable was obviously not a result of construction operations under this contract, and such cables were directed to be repaired by the Engineer, the Contractor shall be reimbursed by the City for actual costs of labor, equipment and material used, plus 15% for profit and overhead.

The Contractor shall also be responsible for repairs for failure to the street lighting cable within the one-year warranty period following contract acceptance which are shown to be a result of the Contractor's construction activities. If the Contractor fails to abide by the requirements herein, the City reserves the right to complete the work independently of the Contractor and deduct the cost thereof from monies due the Contractor under this contract.

The Contractor or his representative shall respond to all emergency calls from the City of Wauwatosa within one (1) hour after notification and provide immediate corrective action. When equipment has been damaged or becomes faulty beyond repair, the contractor shall replace it with new and identical working equipment within one (1) working day. The cost of furnishing



and installing the replaced equipment shall be borne by the contractor at no additional expense. The contractor may institute actions to recover damages from a responsible third party. If at any time, the contractor fails to perform all work as specified herein to keep the temporary lighting system in proper operating condition; and if the contractor's designated personnel cannot be contacted, the City shall have the normal maintaining authority to perform the required repair. The cost of the repair shall be paid by the contractor.

Method of Measurement Temporary Lighting, completed in accordance with the contract, will be measured as a single complete unit of work.

Basis of Payment Temporary Lighting, measured as above, is full compensation for wood poles, guy wires, luminaires, mast arms, wires, conduit, junction boxes, cable guards, for hardware, insulators, tie wire, splices, and circuit cuts; connections to existing lighting units, pull boxes and conduits; for dead ends electrical components; for removals of all installed materials; and for all labor, equipment, tools and incidentals necessary to complete the work.

#### **E1-05 Composite Pull Box, 17x30x18**

Description This work shall consist of furnishing and installing electrical pull boxes in accordance with Section 653 of the Standard Specifications, the plan details, and as herein provided.

Materials Lighting pull boxes shall be a rectangular composite enclosure with sloping (flared) sides and nominal 17" wide x 30" long x 18" depth size as shown on the plans. The composite boxes shall be UL Listed, constructed of polymer concrete and reinforced by a heavy-weave fiberglass. The pull boxes shall be rated for 15,000 lbs. over a 10" x 10" area at a temperature of -50°F (Tier 15 rating). The box shall be furnished with a cover having a "STREET LIGHTING" logo, skid resistant surface with a minimum coefficient of friction of .5 and concrete gray color. The cover fasteners shall be stainless steel captive 3/8-inch hex head bolts with stainless steel inserts.

Pull box manufacturer/model:

Pull Box is a UL (PT1730BA18) listed concrete composite

Construction The pull boxes shall be set flush with the grade or pavement and installed on aggregate per plan details.

Measurement Pull Boxes, completed in accordance with the contract, will be measured as each individual unit acceptably completed.

Basis of Payment Pull Boxes as measured above, is full compensation for furnishing and installing all materials, including pull box, crushed aggregate; for excavation, backfill, disposal of surplus materials; and for all labor, tools, equipment, and incidentals necessary to complete this item of work.

## **E1-06 Composite Pull Box, 30x48x36**

Description This work shall consist of picking up and installing electrical pull boxes, provided by the City of Wauwatosa, in accordance with Section 653 of the Standard Specifications, the plan details, and as herein provided.

Materials The communications pull boxes will be supplied by the City of Wauwatosa, and can be picked-up at the DPW yard located at 11100 W. Walnut Rd. The contractor is to contact City of Wauwatosa DPW (414-471-8422) a minimum of 24 hours in advance to coordinate pick-up.

Construction The pull boxes shall be set flush with the grade or pavement and installed on aggregate per plan details.

Measurement Pull Boxes, completed in accordance with the contract, will be measured as each individual unit acceptably completed.

Basis of Payment Pull Boxes as measured above, is full compensation for picking-up communications pull boxes from City of Wauwatosa and installing all materials, including pull box, crushed aggregate; for excavation, backfill, disposal of surplus materials; and for all labor, tools, equipment, and incidentals necessary to complete this item of work.

## **E1-16 1-Inch HDPE Duct**

## **E1-21 1 ¼-Inch HDPE Duct**

Description All work under this item shall be completed in accordance with Section 655 of the State Specs except as hereinafter amended. Conductors shall be installed after duct is installed and paid for separately.

Materials The duct shall be UL Listed, Type TC7, Schedule 40, black with red strip, and comply with State Specs Section 655. Engineer approved backfill shall be used.

For connection to dissimilar duct/conduit types or extension of existing duct as indicated on plans, provide Duraline Shur-Lock II coupling.

Construction The duct shall be installed in accordance with Section 655 of the State Specs.

Duct shall be installed between 18" to 24" below grade outside the roadway, and 24" to 30" in a 3" PVC Schedule 40 conduit sleeve within the roadway. Conduit to be paid under a separate bid item. Duct shall be installed 6"-12" along the back of curb, or as shown on the plans.

Duct for this item shall be bored or open cut trench as called for on plans. Backfill any voids left from the work with mechanically compacted crushed concrete and restore any disturbed or damaged areas. All restoration is incidental to this item. Protect surfaces from boring machinery and equipment.

Method of Measurement HDPE Duct, completed in accordance with the contract, shall be measured by the linear foot of completed work.

Basis of Payment HDPE Duct measured as above, is full compensation for furnishing and installing all materials, including but not limited to duct, fittings, and couplings, for excavating trenches, excavating bore pits, boring, placing duct, and backfilling; for restoring disturbed or damaged areas, including but not limited to pavement restoration, seeding and sodding; for transporting and disposing of surplus material; and for all labor, tools, equipment, materials, and incidentals necessary to complete this item of work.

### **E1-31 2-Inch HDPE Duct Bored**

Description All work under this item shall be completed in accordance with Section 655 of the State Specs except as hereinafter amended.

Materials The duct shall be UL Listed, Type TC7, Schedule 40, orange, and comply with State Specs Section 655. Engineer approved backfill shall be used.

For connection to dissimilar duct/conduit types or extension of existing duct as indicated on plans, provide Duraline Shur-Lock II coupling.

Construction The duct shall be installed in accordance with Section 655 of the State Specs.

Duct shall be installed between 18" to 24" below grade outside the roadway, and 24" to 30" in a 3" PVC Schedule 40 conduit sleeve within the roadway. Conduit to be paid under a separate bid item. Duct shall be installed 6"-12" along the back of curb, or as shown on the plans.

Duct for this item shall be bored or open cut trench as called for on plans. Backfill any voids left from the work with mechanically compacted crushed concrete and restore any disturbed or damaged areas. All restoration is incidental to this item. Protect surfaces from boring machinery and equipment.

Method of Measurement HDPE Duct, completed in accordance with the contract, shall be measured by the linear foot of completed work.

Basis of Payment HDPE Duct measured as above, is full compensation for furnishing and installing all materials, including but not limited to duct, fittings, and couplings, for excavating trenches, excavating bore pits, boring, placing duct, and backfilling; for restoring disturbed or damaged areas, including but not limited to pavement restoration, seeding and sodding; for transporting and disposing of surplus material; and for all labor, tools, equipment, materials, and incidentals necessary to complete this item of work.

### **E1-42 3" Diameter Schedule 40 PVC Conduit**

Description All work under these items shall be completed in accordance with Section 652 of the State Specs except as hereinafter amended. Conductors shall be installed after conduit is installed.

Materials The conduit and fittings shall comply with Section 652 of the State Specs. Engineer approved backfill shall be used.

Construction The conduit shall be installed in accordance with Section 652 of the State Specs.

Conduit shall be installed between 24" to 30" below grade at roadway crossings, from back of curb to back of curb (use pavement grade for depth). Conduit shall only be installed in other areas and/or depths if shown on the plans.

Conduit for this item shall be bored or open cut trench. Backfill any voids left from the work with mechanically compacted crushed concrete and restore any disturbed or damaged areas. All restoration is incidental to this item.

**An arrow shall be impressed or cut into top of curb by the electrical contractor at any location with a 3-inch conduit crossing in the roadway. Arrows shall be parallel to the crossing.**

Method of Measurement Nonmetallic Conduit, completed in accordance with the contract, shall be measured by the linear foot of completed work.

Basis of Payment Nonmetallic Conduit measured as above, is full compensation for furnishing and installing all materials, including but not limited to fittings and couplings, for excavating trenches, excavating bore pits, boring, placing conduit, and backfilling, for restoring disturbed or damaged areas, including but not limited to pavement restoration, seeding and sodding, transporting and disposing of surplus material, and for all labor, tools, equipment, materials, and incidentals necessary to complete this item of work.

### **E2-05 Electrical Wire 8 AWG**

Description All work under this item shall be completed in accordance with Section 655 of the State Specs except as hereinafter amended.

Materials The conductors shall comply with Section 655 of the State Specs.

Refer to Circuit Identification Requirements section for insulation color coding requirements, or code as noted on the plans.

Construction The conductors shall be installed in accordance with Section 655 of the State Specs. Conductors shall NOT be installed until after all conduit, duct, pull boxes, bases, and any other electrical structures are complete. Full acceptance of cable shall not be completed until testing is performed and passed in the presence of a City representative.

Method of Measurement Electrical Wire, Lighting, completed in accordance with the contract, will be measured by the linear foot.

Basis of Payment Electrical Wire, Lighting measured as above, is full compensation for furnishing and installing all materials, making connections and testing installed cable system, incidental removal and/or rerouting of existing wiring as needed to complete the work, splicing, and for all labor, tools, equipment, materials, and incidentals necessary to complete this item of work.

### **E3-01 23-Ft Standard Concrete Light Pole, Arm, and Fixture**

Description This special provision describes furnishing and installing light poles, mast arms, pole wiring/fusing, fixture, and all miscellaneous hardware required to complete the installation of light poles, in accordance with Section 657 of the State Specs, as shown on the plans, and as hereinafter provided.

Materials Furnish and deliver light pole, arm, and fixture conforming to the details as shown on the plans. The poles shall be sky gray colored, polished finished with acrylic seal.

All standards furnished shall be cast in metal molds true to design. Time of mixing shall be sufficient to ensure that all particles shall be thoroughly wetted. Concrete shall be placed in one continuous operation. When filled, the mold shall be rotated at a high speed to insure a dense concrete by centrifugal force, and produce a cable raceway throughout the length of the standard not less than 2 ½" at the location of the hand holes and a minimum of 1 ½" at top of pole. The poles shall then be polished to a smooth ground finish. Reinforcing shall be in accordance with this specification to assure that no cracking shall occur during normal handling.

The spun concrete poles are to be octagonal in shape and carry a 0.125 inch/foot taper, and have a sky gray finish. Shaft length is in general to be a minimum of 27'-7" and a maximum of 28'-0". The pole is to be 23'-0" above grade. The butt diameter shall be 8" minimum and the top diameter shall be 5" minimum. The hand hole shall be 2 ½" x 12" minimum and 18" above grade. A cable entrance shall be provided on the same side of the pole as the hand hole, it shall be 18" below grade and a minimum size of 2-1/4" x 8". The hand hole cover shall be flush with pole.

The pole shafts shall be fiber reinforced, air-entrained concrete, 5/8" minimum coverage over reinforcement (7,000 psi minimum).

Manufacturer's conformance to specifications shall be certified by an independent testing laboratory.

Poles shall be furnished with flush aluminum cover plate for hand hole and all other necessary hardware. This hardware shall include a removable metal cap which will protect the required open cable raceway at the top from the weather, nonferrous inserts for securing accessories such as cast aluminum pole cap, bracket brace, hand hole cover, etc., 6'-0" x 2" dia. mast arm of galvanized steel or aluminum with 1-1/4" slipfitter, stainless steel or silicone bronze nuts and bolts. Brackets for mast arm are to be one piece (no welds).

All poles shall be guaranteed against defect for a period of 5 yrs. If defects are discovered, poles shall be replaced on a two-for-one basis.

Pole Wiring/fusing: Conductors from the underground cable network shall be Type RHW-2/USE-2 (XLP) individual conductors. In each utilized phase conductor in the handhole, there shall be installed a 1-pole secondary inline 600 VAC fuse assembly as manufactured by BUSS Tron HEB series fuseholder with weatherproof boots, or approved equal, with a KTK fuse. Conductors shall have sufficient length to permit removal of the fuse assembly through the handhole of the pole.

Standard LED Luminaires: Furnish and install LED luminaires and all miscellaneous hardware required to complete the installation of the luminaires, in accordance with section 659 of the standard specifications, as shown on the plans, and as hereinafter provided.

Standard LED luminaires:

Leotek #GCJ1-30J-MV-30K-2R-GY-045-PCR7-RWG-WL-SC

Install LED Luminaires in accordance with the pertinent provisions of section 659 of the standard specifications and as the manufacturer directs.

Measurement Standard LED Luminaires, completed in accordance with the contract, will be measured as each individual unit acceptably completed.

Basis of Payment Standard LED Luminaires as measured above, is full compensation for furnishing all materials including luminaire; transportation; for

furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.

Construction Install the poles as required by plans.

The poles shall be located 2'-6" to center from the face of the curb. The pole shall be located so that the hand hole shall be on the sidewalk side. The pole shall have a back rake so that the sidewalk face of the pole is vertical.

Compacted limestone 3/8" screened chips shall be provided around the base

in accordance with the pole detail. The Contractor shall contact the pole supplier to coordinate delivery time and location. The handhole screws on the new poles are to be lubricated with a non-seizing compound.

Furnish and install all incidental items, including but not limited to nut covers, pole wiring/fusing, and grommets necessary to make the unit complete.

Measurement Light Pole, Arm, and Fixture, completed in accordance with the contract, will be measured as each individual unit completed.

Payment Light Pole, Arm, and Fixture as measured above, is full compensation for materials, including but not limited to poles, arms, fixtures, transformers, pole wiring/fusing, and hardware as necessary to completely install the pole, mast arm, and fixture; for transportation, all labor, tools, equipment, materials, and incidentals necessary to complete the work.

### **E3-03 Removing Direct Buried Lighting Units**

Description This special provision describes removing direct buried concrete lighting units in accordance with the pertinent provisions of section 204 of the State Specs and as herein provided. The work under this item consists of removing and disposing of off-site concrete direct buried lighting pole, arms, and luminaires as shown in the plans, removing and salvaging lighting unit mounted signs, splicing through the circuit at the given site, backfilling any voids left in the ground, and any transporting and disposing.

Materials Engineer approved backfill.

Construction Contractor shall salvage existing LED luminaires and return to the City. Coordinate with Randy Michelz, 414-471-8429.

Contractor shall dispose of existing concrete poles, mast arms, and pole wiring off site in an appropriate manner.

Remove existing conductors in existing underground conduits/ducts and dispose (recycle) off site in an appropriate manner.

Backfill hole left from removal as incidental to this item.

Measurement Removing Direct Buried Lighting Units, completed in accordance with the contract, shall be measured as each individual unit of work completed.

Payment Removing Direct Buried Lighting Units as measured above, is full compensation for removing, transporting and/or disposing of the pole, arms, pole wiring; removing, salvaging, and returning salvaged LED luminaires; removing and salvaging lighting unit mounted signs; splicing through the underground circuit; and for all labor, tools, equipment, materials, and incidentals necessary to complete the work.

<b>INSULATION AND EQUIPMENT TESTING FOR</b> <b>PROJECT:</b> _____					<b>COMPANY:</b> _____ _____
EQUIPMENT OR CIRCUIT NAME:	TEST BY:	TEST RESULT PASS OR FAIL	DATE TESTED:	OWNER OR ENGINEER PRESENT:	COMMENTS:



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## **SECTION 605 – GENERAL PROVISIONS FOR CONSTRUCTION**

### **SECTION 605.1 - GENERAL CONDITIONS**

#### **605.1.01 - PLANS AND SPECIFICATIONS**

All work performed and all materials supplied under this contract shall be in strict compliance with the Contract Documents including plans and specifications and to all other specifications, codes, and ordinances referred to or established by law. The following Specifications are made a part of these Standard Specifications:

- A. The "Standard Specifications for Sewer & Water Construction in Wisconsin" Sixth Edition, December 22, 2003, and any addenda where applicable to sewer and water construction, hereinafter called "Standard Specs."
- B. The **2021** edition with supplements of the State of Wisconsin, Department of Transportation, Standard Specifications for Highway and Structure Construction, hereinafter called "State Specs," excluding Bid Items and Part 7 – Quality Management Program.

In general, all sewer, water, paving, or other construction work in the City of Wauwatosa shall be in accordance with the "Standard Specs", these "City Specs" as they modify and amend the "Standard Specs", "State Specs", and any Contract Special provisions and the terms of the Contract. The Contractor shall also refer to special notes on each sheet of the plans and shall arrange and conduct the work so as to conform to the requirements thereon. These notes shall be an integral and binding part of the specifications.

Copies of the aforementioned Standard Specs are on file at the Engineering Department of the City of Wauwatosa for use and reference on the premises by prospective bidders. An electronic copy of the State Specs can be downloaded from WisDOT's website at the following web address:

<https://wisconsindot.gov/Pages/doing-business/eng-consultants/cnslt-rsrcs/rdwy/ss-archive.aspx>

#### **605.1.02 - PERMITS AND FEES**

The Contractor shall obtain all necessary permits except as noted below. The cost of any permits or fees shall be included in the Contractor's base bid and contract price except where otherwise noted. The amounts for permits and fees are subject to change.

The occupancy permit fee will be waived for this Contract.

There will be **no** permit fee for water services or sewer laterals installed or altered. A properly licensed plumber or utility contractor shall do this work, and the Wauwatosa Plumbing Department has authorized the City's Public Works Inspectors to make detailed inspections of any and all portions of work or materials relating to any sewer

lateral or water service work. The City's Plumbing Inspector may make verification inspections from time to time.

The Contractor will not be billed by the City for inspection time charged to this project by the Engineering Division except as specified in the Standard Specs on Page 1-49, Subsection 1.10.5: Contractor to be charged for inspection after time allowed for completion has expired.

If L.P. Gas is used in a construction shanty, a permit must be obtained from the Fire Department at the Contractor's expense.

#### A. USE OF CITY WATER

Water is only available from select hydrants as identified by the City of Wauwatosa Water Department.

The Contractor shall secure permission from the Water Department, obtain all necessary permits, pay any fees **at their own expense**, and notify the Engineer and Fire Department before obtaining water from fire hydrants. The Contractor shall make his own arrangements and pay all costs for water, connecting to hydrants, and transporting the water to the construction work. The water department will bill the Contractor based on the actual metered amount of water used. The contractor shall not use a hydrant without a hydrant meter in place. Use of a hydrant without a meter will result in the contractor being charged a \$50 fee per use in addition to being charged for the water to fill the water tank to full capacity with the costs to be deducted from monies due the Contractor.

Upon payment of the fees, the City will furnish one hydrant meter setting with vacuum breaker, backwater valve, and control valve. The Contractor shall be responsible for the meter setting and valves at each location water is drawn. By using the meter setting, cross connections to and contamination of the City's water supply is minimized.

**Hoses from hydrants shall not extend across roadways which are open to traffic, unless they are properly protected from any wheel loads.** Water main breaks caused by pressure surges introduced into the system from wheel loads or improper use of hydrants shall be repaired at the expense of the Contractor.

The Contractor shall use only special hydrant-operating wrenches to open hydrants. Hydrant valves must be opened "full" since "cracking" the valve causes damage to the hydrant. If any hydrants are damaged, the Contractor will be held responsible and shall notify the appropriate agency and the Engineer so that all damage can be repaired as quickly as possible. Upon completion of the work, the Contractor shall remove all temporary piping and facilities.

Fire hydrants shall be completely accessible to the Fire Department at all times. No material or other obstructions shall be placed closer to a fire hydrant than permitted

by ordinances, rules, or regulations, or within 10 feet of a fire hydrant in the absence of such ordinances, rules, or regulations.

### 605.1.03 - COOPERATION BY CONTRACTOR

#### A. TRAFFIC

Prior to the preconstruction meeting, the Contractor may be requested by the City to submit to the Engineer, for approval, a written schedule of operations and proposed construction sequencing and staging.

The Contractor shall start work by making the proper notifications as specified, and by placing the necessary detour signs, barricades, warning lights, and warning and information signs to provide for the safety and convenience of the public. Strict adherence to the Manual on Uniform Traffic Control Devices (MUTCD) and Wisconsin MUTCD Supplement is required. Control of arterial traffic shall be in conformance with Section 643 of the current State Specs.

The street shall be kept open to all traffic, and the Contractor shall keep the portions of the street being used by public traffic in such condition that traffic will be reasonably and adequately accommodated, unless otherwise noted. The Contractor shall provide and maintain in safe and adequate condition temporary approaches, crossings, and intersections with roads and necessary driveways. **The Contractor shall bear all of the expense** of maintaining traffic over the section of street undergoing improvement and the construction and maintenance of such approaches, crossings, intersections, and other features as may be necessary without direct compensation except as to those features of such work which are a part of planned, completed construction work.

During the life of the project the Contractor, at all locations, shall provide means satisfactory to the Engineer for crossings for the traffic on intersecting streets in a manner which will not interrupt the flow of such traffic or be harmful to the improvement, unless otherwise noted.

During a suspension of work under the terms of the contract or authorized by the Engineer due to unfavorable weather or other conditions which are not the fault of the Contractor, and which make such suspension advisable, the Contractor shall make passable and shall open to traffic such portions of the street under improvement and such temporary roadways or portions thereof as may be agreed upon between the Contractor and Engineer for temporary accommodation of necessary traffic during the period of suspension. During the period of suspension, the surface maintenance of the traveled way of the temporary route or line of travel agreed upon shall be **at the expense of the Contractor**. When work is resumed, the Contractor shall replace or renew any work or material lost or damaged because of such temporary use of the roadway under improvement. The Contractor shall remove, when required, work or material used in the temporary maintenance thereof, and shall complete the improvements in every respect as though its prosecution had been continuous and without interference, except as may otherwise have been agreed upon by the Contractor and Engineer at the time arrangements

were made for the temporary accommodation of necessary traffic during the anticipated period of suspension.

#### 1. PAYMENT

If there is a separate bid item for Traffic Control, the lump sum price shall be payment in full for all work specified. **If the contract does not include a separate bid item for Traffic Control, then the work required shall be considered as incidental to the contract.**

#### 2. MATERIALS

The Contractor shall furnish, install, and maintain during construction all standard construction signing, barricade(s), barricade lights, and delineation necessary to protect the public traveling in and around the project. Signs shall have reflective backgrounds. Barricades and drums left in place to delineate the traveled way through and around obstructions shall have steady burning lighting affixed to each barricade or drum during darkness. All other barricades shall have flashing warning lights.

#### 3. TRENCH RESTORATION

The Contractor shall replace the pavement in the trench areas, with the specified material, as soon as possible so traffic can utilize the entire width of the roadway, unless otherwise noted. The Contractor shall place a sufficient number of barricades to provide for adequate tapers into and around the sanitary sewer, storm sewer, or water main construction sites.

#### 4. PEDESTRIANS

The Contractor shall make a special effort to accommodate ADA pedestrian traffic in and through the project, particularly by the required replacement of public sidewalk prior to other work, **at his own expense**. Sidewalks not usable shall be barricaded and clearly signed to indicate that the walk is closed per Part 6 of the MUTCD and Wisconsin MUTCD Supplement, and temporary pathways and/or detours shall also be clearly marked and/or signed in this manner. Where removal of sidewalk keystones (and adjacent stones) are specified at intersections, the new curb radius must be in place prior to such removal. However, if the Contractor elects to remove the walks earlier, the Contractor must provide temporary crushed aggregate to grade in their place. Temporary bridges for pedestrians shall be provided as required by the plans or special provisions or as ordered by the Engineer over new pavement, sidewalks, trenches, street intersections, and any other locations as determined by the Engineer. **This work shall be incidental to the contract.**

## B. NOISE AND DUST CONTROL

The Contractor shall so conduct all his operations that they will cause the least annoyance to the residents in the vicinity of the work, and shall comply with all applicable local ordinances, **at the Contractor's own expense**. The compressors, hoists, and other apparatus shall be equipped with such mechanical devices as may be necessary to minimize noise and dust. Compressors shall be equipped with silencers on intake lines.

All gasoline or oil operated equipment shall be equipped with silencers or mufflers on intake and exhaust lines. Storage bins and hoppers shall be lined with material that will deaden the sounds. The operation of dumping rock and of carrying rock away in trucks shall be so conducted as to cause a minimum of noise and dust.

Vehicles carrying rock, concrete, or other material shall be routed over such streets as will cause the least annoyance to the public and shall not be operated on public streets between the hours of 9 p.m. and 7 a.m., or on Saturdays, Sundays, or legal holidays unless approved by the Engineer.

All unpaved streets, roads, detours, or haul roads used in the construction area shall be given an approved dust-preventive treatment or periodically watered to prevent dust. Applicable environmental regulations for dust prevention shall be strictly enforced. **Any application of dust palliative shall be incidental to the contract unless otherwise stated as a separate base bid item.**

## C. NOTICE TO UTILITIES

The Contractor shall give notice in writing to all utilities (such as the gas, electric, telephone, transport company, and all other utilities) that may be affected by the Contractor's operations at least 3 working days before starting work.

The Contractor shall contact all private utilities, through Diggers Hotline, for necessary location or relocation of facilities including, but not limited to, poles, wires, and underground services. The Contractor shall also contact the Wauwatosa Fire and Police Departments when closing a street to all but municipal access. The Contractor shall also be responsible for notifying residents as necessary in regard to the work or the work of subcontractors. Adjustments to MMSD facilities require 72 hour notice to MMSD.

The Contractor shall not hinder or interfere with any person in the protection of such work, or with the operation of buses, at any time, except with the written permission of the Engineer. The Contractor must obtain all necessary information in regard to existing utilities and shall protect such utilities from injury and shall avoid unnecessary exposure so that they will not cause injury to the public. The cost of making repairs in case of any damage whatsoever shall be borne by the Contractor. The Contractor shall also give 3 working days of notice to the following City of Wauwatosa departments and other affected organizations:

1. Traffic & Electrical Supervisor  
Randy Michelz  
414-471-8429
2. Engineering Division  
7725 W. North Avenue  
Construction Inspection & Survey Engineer  
Nick Deming  
414-479-3541
3. Fire Department  
1643 Underwood Ave.  
911 (Emergencies)  
414-471-8490 (Non-emergencies)
4. Police Department  
1700 N. 116th St.  
911 (Emergencies)  
414-471-8430 (Non-emergencies)
5. Water Department  
Water Department Supervisor  
Adam Florin  
414-471-8480 ex: 5915
6. Street and Sewer Department  
414-471-8422
7. Forestry Section  
Urban Forestry & Grounds Superintendent  
Alex Krutch  
c. 414-975-0635
8. Milwaukee Metropolitan Sewerage Commission  
District Construction Services  
260 W. Seeboth Street  
414-225-2241
9. Digger's Hotline  
800-242-8511 (811)
10. Milwaukee County Transit Company  
Melanie Flynn  
1942 N. 17th Street  
Milwaukee, WI 53205  
414-343-1764



#### D. GRAFFITI

The Contractor shall not allow graffiti to remain on any vehicle, equipment, barricade, materials or structures owned, rented, installed, or constructed by the Contractor. The Contractor shall remove graffiti within 48 hours of discovery **at his own expense**. Failure to remove graffiti within 48 hours may result in the City removing the graffiti at the Contractor's expense. These costs shall be deducted from monies owed to the Contractor.

#### E. SNOW REMOVAL

Provide for snow removal in those areas closed to traffic and outside of the traveled way as required to facilitate safe construction operations and provide access to residents. Proper drainage and erosion control shall be maintained in order to minimize runoff across lanes open to travel. The City of Wauwatosa or other Authority Having Jurisdiction (AHJ) shall be responsible for maintaining travel lanes fully open to traffic and sidewalks that remain open to traffic or as otherwise defined by city ordinances. The Contractor shall be responsible to clear snow from closed travel lanes (including travel lanes closed to through traffic) and sidewalks to the satisfaction of the City Engineer prior to opening closed lanes and sidewalks to traffic. The contractor shall maintain any and all traffic control for closed lanes and sidewalks that may be impacted by the snow removal operations of the City of Wauwatosa or other AHJ. This work shall be considered incidental to the contract.

#### 605.1.04 - SCOPE OF WORK

##### A. SITE INVESTIGATION AND REPRESENTATION

The Contractor acknowledges that **they have** satisfied **themselves** as to the nature and location of the work, the general and local conditions – particularly those bearing upon the availability of transportation, disposal, handling, and storage of materials, and those bearing upon vehicular access to commercial, industrial, and residential properties – the availability of labor, water, electric power, and roads, uncertainties of weather, river stages, or similar physical conditions at the site, the conformation and conditions of the ground, the character of equipment and facilities needed preliminary to and during the prosecution of the work, and all other matters which can in any way affect the work or the cost thereof under this Contract.

The Contractor further acknowledges that **they have** satisfied **themselves** as to the character, quality, and quantity of surface and subsurface materials and groundwater to be encountered from inspecting the site, as well as from information presented herein as a part of these Contract Documents. Any failure by the Contractor to acquaint **themselves** with all the available information will not relieve **the Contractor** from responsibility for properly estimating the difficulty or cost of successfully performing the work. Neither the Owner nor the Engineer assumes responsibility for any conclusion or interpretation made by the Contractor on the basis of the information made available by the Owner or the Engineer.

## B. FIELD RELOCATION

During the progress of the work, minor relocation of the work may be necessary. Such relocation shall be made only with the agreement of the Engineer. If existing structures are encountered that will prevent construction as shown, notify the Engineer before continuing with the work in order that the Engineer may make such field revisions as necessary to avoid conflict with the existing structures, or to have the affected utility altered by others. The Contractor shall proceed to work on other portions of the project during the delay. No additional compensation will be given for such delays. If the Contractor proceeds with the work despite this interference, **they** shall be responsible for any damage that may occur.

### 605.1.05 - PROTECTION OF WORK

#### A. ACCESS FOR EMERGENCY, PUBLIC TRANSPORTATION AND POSTAL VEHICLES

Notify the fire department, police department, and applicable public and school transportation companies at least 3 working days before closing any street or portion thereof. No closing shall be made without appropriate concurrence of aforementioned departments. Notify said departments when the streets are again passable for emergency vehicles. Maintain vehicle access to consecutive arterial crossings or dead end streets in excess of 300 linear feet, unless special written permission has been obtained from the Fire and Police departments.

The Contractor shall provide a 24 hour emergency telephone number or numbers with the Fire and Police departments so that contact may be made easily at all times in case of barricade or flare trouble or other emergencies.

The Contractor shall develop a written plan for the storage of vehicles and materials at the construction site. This plan shall be submitted to the Construction Engineer for his approval prior to starting construction. **If the Contractor wishes to use any property outside the City right-of-way, they must provide written approval from the property owner to the City.**

Maintain postal service facilities in accordance with the requirements of the US Postal Service.

### 605.1.06 - LEGAL RELATIONS

#### A. GENERAL

##### 1. SAFETY

The Contractor shall be solely and completely responsible, at his expense, for conditions at the job site, including safety of all persons (including employees) and property during execution of the work. This requirement shall apply continuously and not be limited to normal working hours. Project safety

provisions shall conform to US Department of Labor (OSHA) requirements, the Wisconsin Occupational Safety and Health Act, and all other applicable laws including those which may be specified in other parts of these Contract Documents, and shall in any event comply with the common law standards of due care. Where any of these are in conflict, the more stringent shall apply. The Contractor's failure to thoroughly familiarize **themselves** with these safety provisions shall not relieve **the Contractor** of responsibility.

## 2. CONSTRUCTION SAFETY PROGRAM

The Contractor shall develop, and maintain for the duration of the Contract, a safety program that will effectively incorporate and implement, as a minimum, all required safety provisions. The Contractor's Superintendent shall be qualified and experienced in construction safety and shall be at the work site and be authorized to supervise and enforce compliance with the safety program. A written outline of the Contractor's safety program may be required prior to commencing any operations, for record purposes only.

## 3. SAFETY EQUIPMENT

The Contractor shall maintain at the job site safety equipment applicable to the work as prescribed by the governing safety authorities, including all articles necessary for giving first aid to the injured, and shall establish the procedure for the immediate removal to a hospital or a doctor's care of persons who may be injured on the job site. The Contractor shall do all work necessary to protect the general public from hazards including, but not limited to, surface irregularities or un-ramped grade changes in pedestrian sidewalks or walkways, and trenches or excavations in roadways.

Barricades, lanterns, and proper signs shall be furnished by the Contractor and placed as necessary to insure safety to the public and the work at his own expense.

## 4. COMPLAINTS

All complaints received by the Contractor shall be reported to the Engineer no later than the working day following receipt thereof. Such reports shall include the name, address, date, time received, date and time of action complained about, and a brief description of the alleged damages or other circumstances upon which the complaint is predicated.

Each complaint shall be assigned a separate number and all complaints shall be numbered consecutively in order of receipt. In the event more than one complaint is received from the same complainant, each later complaint shall show all previous complaint numbers registered by the same complainant. In addition, a summary report shall be made to the Engineer each month which shall indicate the date, time, and name of the person investigating the complaint, and the

amount of damages claimed (or estimate thereof), including the amount of settlement, if any.

When settlement of a claim is made, the claimant shall furnish the Engineer with a copy of the release of claim. The Owner shall be notified immediately, throughout the statutory period of liability, of any formal claims or demands made by attorneys on behalf of claimants, of the serving of any notice, summons, subpoena, or other legal documents incidental to litigation, and for any out-of-court settlement or court verdicts resulting from litigation.

## 5. NOTICE OF WORK

The Contractor shall provide written notice to the Engineer at least 5 days prior to the start of actual construction. If requested by the City, the Contractor shall provide written notice of work to affected property owners and residents adjacent to the construction at least 3 days prior to the start of actual construction to such properties.

The Contractor shall develop a written plan for the storage of vehicles and materials at the construction site. This plan shall be submitted to the Construction Engineer for his approval prior to starting construction. **If the Contractor wishes to use any property outside the City right-of-way, they must provide written approval from the property owner to the City.**

## 6. TRAFFIC SAFETY AND ACCESS TO PROPERTY

Comply with all laws regarding closing or restricting the use of public streets or highways. No public or private road shall be closed except by express written permission of the Engineer. Conduct the work so as to assure the least possible obstruction to traffic and normal commercial pursuits. Protect all obstructions within traveled roadways by installing signs, barricades, and lights where necessary for the safety of the public.

Signs, barricades, lights, and other traffic control devices shall conform to the requirements of the State of Wisconsin Manual of Uniform Traffic Control Devices (MUTCD).

The convenience of the general public and residents adjacent to the project and the protection of persons and property are of prime importance and shall be provided for in an adequate and satisfactory manner. During construction operations, construct and maintain such facilities as may be required to provide access by all property owners to their property. Pedestrian access to properties adjacent to the work shall be provided for at all times. **This work shall be incidental to the contract unless otherwise stated as a bid item.**

Where traffic will pass over backfilled areas before they are permanently paved, and where, in the opinion of the Engineer, the final pavement replacement has not followed in a timely fashion, the top of the area shall be maintained with

temporary bituminous surfacing that will allow normal vehicular traffic to pass over. **This shall be done at no additional cost to the City.** This does not apply to sections where no surface replacement is called for under this contract. If the Engineer orders this type of restoration for such sections that do not call for surface replacement, the Contractor shall be paid at the amount specified under the temporary asphalt item included in the contract. If a temporary asphalt item is not included within the contract, the Engineer will pay the amount in the Schedule of Fixed Extras.

Temporary access driveways must be provided where required. The Contractor shall maintain access to driveways by use of steel plates, compacted gravel, and/or temporary asphalt when practicable. **This work shall be incidental to the contract unless otherwise stated as a bid item.**

Cleanup operations shall follow immediately behind backfilling and the work site shall be kept in an orderly condition at all times. The Contractor shall immediately clean up accidental spills of any type of material that may be a hazard to safe movement of vehicular traffic. Where the type and amount of spilled material creates a hazard, the Contractor shall immediately post flag persons, initiate cleanup, and advise the Engineer of the spill.

Flag persons shall follow MUTCD requirements and have the proper safety equipment and apparel, per MUTCD and OSHA recommendations.

## B. FIRE PREVENTION AND PROTECTION

The Contractor shall execute all work in a fire-safe manner. **The Contractor** shall supply and maintain on the site adequate firefighting equipment capable of extinguishing incipient fires. The Contractor shall comply with applicable fire prevention laws. Where these laws do not apply, applicable parts of the National Fire Prevention Standard for Safeguarding Building Construction Operations (NFPA No. 241) shall be followed.

### 605.1.07 - PROSECUTION AND PROGRESS

The work shall be performed at such time and in or on such parts of the project and with such forces, materials, and equipment to prevent any delay to the completion of the project within the time limits stated in the Contract, and in conformance with the Overall Construction Schedule specified herein.

The contractor may petition the Board of Public Works for approval of night work (7 p.m. to 7 a.m.) or Sunday work. The Board generally meets the 1<sup>st</sup> and 3<sup>rd</sup> Monday of every month. A request for approval of night or Sunday work must be made on a Board of Public Works Application and received by the appropriate City staff by deadlines indicated on the application form. No fees will be assessed to the Contractor for a request to the Board of Public Works to perform night work or Sunday work. The Contractor shall comply with all applicable requirements of the Owner. Please send an electronic copy of the completed application to BoPW to

ndeming@wauwatosa.net and jhenderson@wauwatosa.net by the deadlines listed on the form in addition to any recipients required on the application form.

The Contractor may, with written permission of the Engineer and acquisition of all necessary permits, **and at the contractor's expense**, work outside regular hours of 7 a.m. to 7 p.m., Monday through Friday (City holidays are not considered part of this regular working week). A written request shall be made to the Engineer and allow 10 calendar days for satisfactory arrangements to be made to inspect the work in progress which occurs between 7 p.m. and 7 a.m. on Sundays, and allow 3 regular working days for satisfactory arrangements to be made to inspect the work in progress which occurs on 7 a.m. to 7 p.m. on Saturdays.

The Contractor shall not be allowed to perform work on City holidays without written permission from the Engineer.

If the Contractor schedules work outside regular hours and days which requires an inspector, and does not arrive on site within one hour of the scheduled time on the scheduled day, excluding inclement weather conditions, the Contractor shall be charged a fee of \$300 to the City, to be deducted from monies owed to the Contractor. The scheduled day shall count as a working day towards the completion of the project deadline regardless of whether the Contractor works. If the Contractor needs to cancel the work scheduled outside regular hours and days, they must contact the City Engineering Department or the inspector who is scheduled to be on site at least 24 hours in advance of the scheduled time and date.

#### A. PRECONSTRUCTION CONFERENCE REQUIREMENTS

A preconstruction conference shall be held after the time of the Contract award and before the notice to proceed to discuss the responsibility of each party in the project and to clarify any questions. Required attendance shall include representatives of all contractors, including the superintendents designated for the project, resident engineer in charge of inspection and his principal staff, and representatives of the municipality or governing authority. A representative of the resident inspection staff shall preside over the conference.

The Contractor shall submit to the Engineer for approval a schedule of operations and proposed construction sequencing and staging, as described in section C below. The Engineer may waive this requirement for the convenience of the City. This schedule will be used to check and control the progress of the work.

A suggested format for the preconstruction conference would include but not be limited to the following subjects:

1. Presentation of a proposed *Overall Construction Schedule* by the General Construction Contractor.
2. Presentation of *Traffic Control Plan* by the Contractor.
3. Review of *Erosion Control Plan*.

4. Check off required bonds and insurance certifications prior to notice to proceed.
5. Shop drawing submittal and approval procedure.
6. Chain of command, direction of correspondence, and coordinating responsibility between contractors.
7. Request for a weekly job meeting for all involved.
8. Laboratory testing of materials requirements.
9. Inventory of material stored on site provisions.
10. Progress estimate and payment procedure.

## B. PRECONSTRUCTION SURVEY

After the Contract is awarded and before starting the work, the Contractor shall make a thorough examination, and should photograph, in color, if the Contractor feels it is warranted, all existing buildings, structures, and other improvements which are within 100 feet of the work and/or which might be damaged by the Contractor's operations. The examination may be made jointly by the Contractor, the Engineer, and the property owner. The scope of the examination and photographs taken shall include cracks in structures, settlement, leakage, and similar conditions.

The above records and photographs are intended for use as evidence in ascertaining the extent of any damage which may occur as a result of the Contractor's operations and are for the protection of property owners, the Contractor, and the Owner. The records will provide a means of determining whether, and to what extent, damage may have occurred as a result of the Contractor's operation. The City intends to videotape the condition of the roadways and the areas surrounding the project sites when possible.

## C. OVERALL CONSTRUCTION SCHEDULE

The Contractor shall prepare and submit to the Engineer within 10 working days after the awarding of the Contract his Overall Construction Schedule. The Overall Schedule shall be comprised of preparatory and construction operations covering all work to be done in connection with the Contract.

Failure to submit the Overall Schedule or subsequent updates of the Schedule shall be considered cause for withholding any partial payments due or that may become due under the Contract.

Therefore, it is imperative that the Contractor adheres to the completion dates listed in the Official Notice and Instructions to Bidders. If after the award of any paving contracts it is determined that a change in sequence would be mutually beneficial to all parties involved, the Engineer shall issue a Contract Modification. However, this modification will not alter the final completion date unless otherwise agreed upon and noted in the Contract Modification.

The Overall Schedule shall meet the following minimum requirements:

1. Include activities that describe essential features of the work and activities that might potentially delay contract completion. Identify activities that are controlling items of work. Procurement of long lead time items shall be included as tasks within the schedule but can exceed the 15 working day duration limit noted below. Build in the specified amount of severe weather days as specified in the contract.
2. Identify the contemplated start and completion dates for each activity. Provide a duration, ranging from one to 15 working days, for each activity. Break longer activities into 2 or more activities distinguished by the addition of a location or some other description.
3. For contracts with 15 activities or less or 8 weeks or less in duration, specify the sequencing of all activities. For contracts with more than 15 activities or longer than 8 weeks in duration, provide a logic diagram that shows the sequence of activities and the scheduling interrelationships among activities. Alternatively, the contractor may identify the activity interrelationships in a tabular listing. Ensure all activity interrelationships are finish to start relationships with no leads or lags. Use only contractual constraints in the schedule logic. The engineer may accept requested exceptions.
4. Provide on or with the schedule the following information:
  - a. Work days per week
  - b. Number of shifts per day
  - c. Number of hours per shift
5. Show completing the work within interim completion dates and the specified contract time or completion date.
6. Provide the engineer with a pdf copy of the information required in items 3 and 4.

Handwritten schedules are NOT acceptable. It is recommended that the contractor include third-party activities related to the contract within the schedule if third-party work is anticipated to occur within coordination of the project.

As the work progresses, the Engineer may request an update to the original progress schedule for reasons including but not limited to the following:

1. The project completion or interim completion targets are delayed 14 calendar days or more for portions of work governed by calendar days or 10 working days or more for portions of work governed by working days.
2. The progress of the work differs significantly from the original progress schedule.
3. A contract change order requires the addition, deletion, or revision of activities that causes a change in the contractor's work sequence or the method and manner of performing the work.

**The Overall Schedule shall be incidental to the contract.**



#### 605.1.08 - MAILBOXES

(Where Applicable) Maintaining mailboxes along the construction route is the responsibility of the Contractor, including his subcontractors, and shall be incidental to the work. The Contractor shall notify the property owner(s), if necessary, prior to the start of work that their mailbox may require removal and replacement. A notification letter will be provided by the Engineer for distribution by the Contractor if requested. Mailboxes which require removal as part of any work shall be carefully removed by the Contractor and delivered to the property owner. Resetting the mailbox shall be the responsibility of the Contractor. The Contractor shall also, at his own expense, maintain a temporary mailbox to allow the property owner to continue receiving mail until such time as the permanent resetting is completed. **The Contractor shall coordinate the location(s) of any temporary mailboxes with the United States Postal Service and the Engineer. Temporary mailboxes shall be keyed mailboxes unless otherwise approved by the Engineer.**

Should a mailbox be damaged as the result of any construction activity, the Contractor shall take the responsibility of repairing, replacing, and/or re-installing it at his own expense, within a reasonable amount of time as determined by the Engineer. The Contractor shall also, at their own expense, maintain a temporary mailbox to allow the property owner to continue receiving mail until such time as the permanent repairs are completed, if needed. Failure of the Contractor to complete this work in a timely fashion, as determined by the Engineer, may result in the City hiring a third party or using a City crew to perform it, at the Contractor's expense, to be deducted from monies owed to the Contractor.

Any and all work relating to mailboxes shall be incidental to the contract unless otherwise listed as a separate base bid item or directed by the Engineer.

#### 605.1.09 - PAYMENT

The work specified in this Section 605 shall be considered **incidental to the contract** and the cost shall be included as part of the appropriate unit price stated in the Proposal unless otherwise stated.

Lump sum amounts are not subject to negotiation for cases where actual amounts of work and/or materials are larger than the engineering estimates.

Existing sign removal and re-installation as indicated on the plans and as directed by the Engineer shall be **incidental** to the contract base price unless otherwise noted.

## SECTION 605.2 - CONSTRUCTION GENERAL

### 605.2.01 – Driveways

Driveway access shall be maintained at all times whenever possible, unless directed by the Engineer or stated on the plans. This may require driveways to be constructed one-half at a time, with steel plates, and/or the coordination with the business or industry, or a temporary driveway access point. This maintenance of approach access shall be considered incidental to the work. Maintenance of driveway access to residential properties may be waived with the written permission of the Engineer.,

**The Contractor shall be limited to a maximum of 30 calendar days from the time an approach, its adjacent sidewalks, and/or adjacent curb and gutter is removed, to the time that said pavements have sufficient cure time for bearing vehicle traffic from the street to the property or alley.** Failure of the Contractor to meet this deadline will cause the City to charge liquidated damages of \$25 per day **per approach** until access is provided.

For contracts that do NOT include replacing all of the curb and gutter and/or all of the existing pavement (ie. selective replacement of these two items), the above time frame is reduced in the following manner, unless otherwise directed by the Engineer or shown in the plans:

- Residential driveways shall be replaced within 5 days after removal of the driveway approach or sidewalk.
- Driveway access to commercial and industrial properties shall be maintained at all times.

### 605.2.02 - BACKFILL

#### A. MAINTENANCE OF TRENCH SURFACE

The Contractor will be required to maintain the trench area, during the interval between the sewer or water main installation and the pavement restoration, by keeping it to grade and spreading calcium chloride, if necessary, for dust control. This trench maintenance shall be **incidental** to the contract, unless otherwise noted.

Settlement of replaced pavement over trenches within the warranty period shall be considered the result of improper or inadequate compaction of the subgrade or backfilling materials. The Contractor shall promptly repair all pavement deficiencies noted during the warranty period at no cost to the City.

### 605.2.03 - PAVEMENT RESTORATION AND SITE RESTORATION

#### A. PAVEMENT RESTORATION

##### 1. PROTECTION OF STRUCTURES

Provide whatever protective coverings as necessary to protect the exposed portions of bridges, culverts, curbs, gutters, manhole and valve box covers, posts, guard fences, road signs, and any other structures from splashing oil, asphalt, or concrete from the paving operations. Remove any oil, asphalt, concrete, dirt, or any other undesirable matter that may come upon these structures by reason of the paving operations.

Where water valve boxes, manholes, catch basins, or other underground utility appurtenances are within the area to be resurfaced, the structure shall be level with the top of the final restoration grade as directed by the Engineer. If it is evident that these facilities are not in accordance with the proposed finished surface, notify the Engineer **a minimum of 14** calendar days in advance so the proper authority can be contacted in order to have the facility altered before proceeding with the resurfacing. Consider any delays experienced from such obstructions as **incidental** to the paving operation.

## B. LAWN REPLACEMENT AND LANDSCAPING

Topsoiling, mulching, fertilizing, and seeding shall conform, respectively, to Sections 625, 627, 629, 630 and 631 of the State Specs and as they are amended herein.

All landscaping work must be watered until sustained growth is assured. All watering shall be considered **incidental** to the contract.

Backfill required at curb repairs must be topped with a minimum of 6 inches of screened topsoil to top of curb.

**If restoration in accordance with these specifications is not completed (aside from watering) within 2 weeks of the completion of adjacent paving and underground operations (restoration may be delayed with written permission from the Engineer), the City reserves the right to hire a third party, independent of the Contractor, to complete the work, or utilize City workers, to be paid with funds deducted from monies owed to the Contractor. Should the City exercise this right, the Contractor will not be paid for any of the quantities that were completed by the third party or City workers.**

### 1. GENERAL

The Contractor shall give the Engineer at least 3 working days of notice of the time and place of planting and keep them advised of the schedule of planting operations.

### 2. SOIL PREPARATION

Remove any non-topsoil material to a depth of 6 inches and backfill with topsoil/compost blend as specified in Section 625.2 of the State Specs. Apply a Type A granular fertilizer per the supplier/manufacturer's specified rate and mix

into the upper 4 to 6 inches of soil thoroughly. Rake or drag area until surface is thoroughly settled with a smooth, firm surface, free of humps or hollows. Ensure proper placement to eliminate the risk of future settling or sinking.

The Contractor shall dispose of all extraneous and excess materials at his expense and in accordance with any Federal, State, or Local laws.

### 3. SOD

All sod shall be placed on topsoil as specified within 24 hours after it has been cut. It must be staked or pegged on all slopes steeper than one foot vertical to three feet horizontal and where shown on the plans, which shall be incidental. The sod for Type "A" Lawn Replacement shall be a blend of bluegrass and fescues nursery sod, and shall be practically free from weeds or undesirable grasses. Sod must be placed to a butt joint and not wedged-off with topsoil. After being placed, it must be rolled or tamped. **All sod work must be watered for a minimum of 10 consecutive calendar days by the Contractor or until sustained growth is assured. The contractor shall provide 3 days notice to residents prior to turning over watering requirements to the resident.**

### 4. SEED

All areas designated to be seeded shall be placed on topsoil fertilized with a Type A granular fertilizer fertilizer per the supplier/manufacturer's specified rate and covered with Urban Type B erosion mat, unless otherwise specified. The seed mix for Type "C" Lawn Replacement shall be as noted below unless otherwise noted in the plans, free from weeds or undesirable grasses. After being placed, rake seed/soil as necessary to provide seed to soil contact and covered with mulch or erosion fabric where designated. All seed, mulch, and erosion fabric work must be watered until sustained growth is assured, a minimum of 14 calendar days.

- a. General Lawn Areas: Wisconsin Department of Transportation Seed Mixture No. 40. Seeding rate shall be 4-5 pounds per 1000 square feet. Provide the empty seed bags brought to site to the inspector immediately after installation.
- b. River Banks, Ravine Slopes, and Drainage Swales: Shady woodland seed mix shall be used for wet mesic to dry mesic soils. Species such as Solomon's Plume, Columbine, Jacob's Ladder, Jackin-the-Pulpit, Wild Geranium, and Early Meadow Rue are representative of a natural woodland. Seeding rate shall be in accordance with suppliers instructions.

### C. SIGNAGE

New signs called out to be provided under the contract shall conform to Section 637 of the State Specs. New signs shall be installed on new posts and shall have hardware provided by the Contractor and included with the costs of the signs and/or sign post item(s).

New posts shall be 2" (2 3/8" O.D.) x 10' Schedule 40 Aluminum extruded post with a mill finish and plain end. The Post Anchor shall be Tapco V-Loc Steel Breakaway post or Engineer approved equal.

Hardware to attach existing signs to new poles shall be salvaged from the existing signs and posts, unless otherwise noted. New hardware required to resinstall existing signs shall be approved by the Engineer prior to ordering.

Signs, posts and materials within the project limits may be removed and salvaged and shall be stored at the DPW Yard until reinstallation. Obtain permission from the Engineer to removal signs, posts, etc. if no item to remove, salvage and reinstall signs exists on the contract. Sign posts that are not V-Loc Steel Breakaway posts shall be disposed of by the Contractor at their expense. If no item to remove, salvage and resinstall signs, posts & hardware, the work shall be considered incidental to the contract and performed at the Contractor's expense. The Contractor shall provide a minimum of 3 days notice to DPW Electrical Superintendent before delivering the signs to the yard.

Prior to delivering the signs to the DPW Yard, the contractor shall provide a detailed list to the DPW Electrical Superintendent containing the following information:

1. Description and number of each sign(s) being delivered to the DPW Yard that will be reinstalled
2. Number of brackets being salvaged to the yard
3. Number of poles being salvaged to the yard that will be reinstalled.
4. The list shall have the contract number, the project description, the name of the contractor storing the materials and a contact person listed at the top of the page.

Upon delivery to the DPW Yard, the contractor shall assist the City/consultant inspector on the project to verify that all signs, hardware, posts and other materials contained on the list have been delivered. The Contractor shall store the signs in a manner that will not cause the signs to be damaged while being left in storage. All loose hardware shall be stored together in a labeled box or storage container noting what hardware is stored in each box or storage container. The box or storage container shall also be labeled with the contract number and the project description.

The Contractor shall be responsible for replacing any signs, posts or hardware that are damaged as a result of construction operations or due to improper storage by the contractor. The Contractor shall also be responsible to replace any missing signs, posts or hardware that were not properly delivered and stored to the DPW Yard.

The Contractor shall notify the inspector of any damaged signs, posts or hardware prior to removal for documentation purposes. Failure to notify the on-site inspector prior to removal may result in the Contractor being responsible for replacement of the damaged signs, posts or hardware.

The Contractor shall immediately notify the Engineer of any signs, posts, or hardware that the Contractor deems unsuitable to be salvaged and reinstalled to allow the Engineer to resolve any concerns prior to reinstallation. The Engineer may require the contractor to furnish new material(s) under the contract using a bid item in the proposal or, if no such item exists for a particular item deemed unsuitable for reinstallation, by negotiating a price for replacement. The City also may elect to provide new material(s) to the contractor for reinstallation at no additional cost to the City.

The Contractor shall provide the DPW Electrical Superintendent with a minimum of 7 calendar day's notice prior to picking up the stored signs, posts and hardware. The City may replace salvaged signs, posts and hardware at their discretion while the signs are in storage at the DPW Yard. Before removing items from the DPW Yard, the contractor shall verify ALL items are present that were documented as delivered to the DPW Yard for storage. Notify the Engineer immediately and DO NOT remove any items from the DPW Yard if any item is missing. The Contractor will be responsible to replace any items discovered missing after removal of all items from storage at the DPW Yard.

#### 605.2.04 PROTECTION OF THE ENVIRONMENT

##### A. GENERAL

The Contractor, in executing the work, shall maintain all work areas on and off the site as needed to keep them free from environmental pollution that would be in violation of any Federal, State, or Local regulations. All costs related to conformance with Protection of The Environment within these City Specs shall be considered incidental to the contract, unless otherwise noted by the Engineer.

##### B. PROTECTION OF SEWERS

Take adequate measures to prevent the impairment of the operation of the existing sewer system. Prevent construction material, pavement, concrete, earth, or other debris from entering a sewer or sewer structure. All sewer and groundwater flow interfering with construction and requiring diversion shall be diverted to sewers leading to a wastewater treatment plant. Non-sanitary sewage may only be diverted to non-wastewater treated areas if proper erosion and pollution control measures are followed in accordance with Wisconsin DNR regulations.

Prior to commencing excavation and construction, the Contractor shall submit for the City's review detailed plans (including routing and connections) showing how **the Contractor** intends to handle and dispose of sanitary sewer wastes. By reviewing the plan, the City neither accepts any responsibility for the adequacy thereof nor for any damages to public or private property resulting therefrom, such responsibilities remaining with the Contractor.

##### C. PROTECTION OF AIR QUALITY

Air pollution shall be minimized by wetting down bare soils during windy periods, by requiring the use of properly operating combustion emission control devices on

construction vehicles and equipment used by contractors, and by encouraging the shutdown of motorized equipment not actually in use.

Burning of waste, debris, and rubbish will not be permitted on the construction site.

If temporary heating devices are necessary for protection of the work, such devices shall be of a type that will not cause pollution of the air.

#### D. EROSION CONTROL FOR SEWER & WATER INSTALLATIONS IN PAVED AREAS

##### 1. GENERAL

The latest edition of the DNR technical standards shall be adhered to for erosion control installation and maintenance, and shall overrule any potential specifications conflicts herein. Chapter 2.8.0 of the Standard Specs contains the general criteria for erosion control. In addition, since the control of soil erosion is a dynamic process, the Contract requires flexibility by the Contractor to accommodate changing conditions as the project progresses.

Excavated materials and imported backfill materials stored at the project site shall be kept to a minimum and shall be used or removed from the site as soon as practicable, which shall be incidental. Such materials shall be stored in such a manner that will not result in runoff of stockpiled materials. Backfilled trenches and other areas shall be left to the level of the adjacent area or slightly below until restored to reduce the potential for erosion. All excess excavated materials and all excess imported backfill materials shall be promptly removed from the site and disposed of at the Contractor's expense.

The Contractor shall monitor each location where water may run off the site and shall provide measures to guard against sediments leaving the site. The Contractor shall have adequate erosion fabric fence or bales of hay and means of anchoring the same in place for erosion control as determined necessary by the Engineer. The type and amount of materials required will be determined by the type and amount of open excavation. The Contractor shall schedule the work so that the amount of open excavation and the stockpiling of construction materials on the job site is minimized for erosion control. Diversion berms or sediment filtration berms shall be constructed and maintained as determined necessary by the Engineer. Replacement of preexisting erosion control measures which are disturbed in the course of the work shall be completed promptly following completion of the work on the project causing such disturbance.

Tracking of foreign materials (e.g. mud, stone) on street surfaces shall be controlled during the working day as necessary, but no later than the end of the working day, by one or more of the following methods as required:

- a. Hand shoveling material off street pavement.

- b. Machine removal (such as with end loader or grader), provided that the results are equal to that of hand shoveling.
- c. Sweeping material off street pavement. If using a mechanical sweeper that does not contain a built in water system to mitigate dust, the contractor shall sufficiently wet the surface or the area needing to be swept prior to sweep to reduce **the spread of** dust.

Specific erosion control measures are shown on the plans and shall be as described in these specifications. Sample details of erosion control devices follow these specifications. All control measures protruding above the normal paved and/or ground surface shall be marked by barricades and flashers. Maintenance of erosion control measures shall be considered **incidental**, including if an erosion control device needs to be replaced.

## 2. CONTROL OF SURFACE RUNOFF

- a. STORM WATER INLET AND CATCH BASIN, hereinafter called inlet protection: Inlet protection shall be installed **prior** to disturbing any pavement or earth areas, and shall remain in place and maintained until the surface is restored with temporary or permanent pavement. Inlet protection shall be installed at all inlets that will receive runoff from the construction site, including adjacent streets and where materials are stockpiled. Depending on the slope of the street, this will include inlets in the block(s) downstream from the work site due to anticipated bypassing. The contractor shall install Type D inlet baskets at all locations permissible. The contractor shall indicate on their erosion control implementation plan those inlets which Type D inlet protection is unable to be placed and their proposed substitution.

PLACEMENT: The inlet insert basket or sheet shall fit into the inlet without gaps around the insert as illustrated in the detail drawings. If the inlet being protected has a curb box, the curb box shall be protected as shown in the appropriate detail drawings until inlet protection is no longer needed.

FABRIC SPECIFICATIONS: The filter fabric shall be a geotextile fabric Type FF of polyester, polypropylene, stabilized nylon, polyethylene, or polyvinylidene chloride meeting the following specifications:

- Grab strength: 120 lb. minimum in the machine direction and 100 lb. in the cross machine direction (ASTM D4632).
- The fabric shall have an opening no greater than a number 30 US Standard Sieve.
- Water Flow Rate of approximately 120 gal/min/ft<sup>2</sup> at 50 MM constant head as determined by multiplying permittivity in sec as determined by ASTM D-4491 by a conversion factor of 74.



- Ultra violet radiation stability of 70% for strength retained at 500 hrs of exposure (ASTM D4355).

MAINTENANCE: Inlet protection shall be inspected by the Contractor within 24 hours after each working day rainfall or daily during periods of prolonged rainfall on working days. Repair or replacement shall be made immediately as incidental to the work.

Sediment deposits shall be removed after each storm event, or more often if the fabric becomes clogged.

#### b. GUTTER DETENTION

1. In areas where the street grade is greater than 4%, additional control is necessary to reduce flow velocity and to prevent sediment from bypassing the inlet screen/inlet grate screen.
2. Gravel filled nylon bags each containing a minimum of one-half cubic foot of material shall be placed in the gutter section with the long dimension of the bag perpendicular to the curb line, abutting the curb face at approximately 75 foot intervals.
3. Sediment deposits shall be removed after each storm event, or when reaching a maximum depth of 3 inches.
4. If the street is open for traffic, a barricade with flashers shall be placed by each bag.
5. The protection shall be installed prior to disturbing any pavement or earth areas, and shall remain in place and be maintained until the surface is restored with temporary or permanent pavement.

### 3. CONTROL OF TRENCH SEDIMENT

#### a. DEWATERING

1. If it becomes necessary to pump water from any trench or excavation, it shall be the Contractor's responsibility to remove particles greater than 100 microns. To demonstrate that settling or filtering is not required, all particles must pass through a US Standard No. 140 sieve.

#### 2. METHODS OF REMOVAL

- a. Pumped water requiring particle removal may be settled in portable tanks. The tank capacity must be large enough to allow for sufficient settling time to remove particles greater than 100 microns. The Contractor may add a flocculation substance to enhance the settlement process.

- b. A second method of treating pump water may be as shown in the detail drawings, if applicable. This basin should be placed on the paved surface near a protected inlet. If a temporary settling basin is to be left unattended, it shall be covered with a half inch plywood or similar safety cover. Due to space and traffic constraints, this method must have prior approval from the Engineer.
  - c. The fabric shall be geo-textile fabric, polyester, polypropylene stabilized nylon, polyethylene, or polyvinylidene chloride meeting the following specifications:
    - Grab strength: 400 lb. minimum in any principal direction (ASTM D1682)
    - Mullen Burst Strength: Minimum 600 psi (ASTM D774)
    - The fabric shall have an opening no greater than a number 140 US Standard Sieve, and a minimum permeability of 25 gpm/sq.ft. (Multiply the Permittivity in Sec. from ASTM. D4491-85 Constant Head Test using the conversion factor of 74.)
  - d. Other methods demonstrated to produce the desired results may be submitted for the approval of the Engineer.
- a. DOWNSTREAM SEWER PROTECTION: At the end of each work day, the Contractor shall cover the entire annular space at both ends of the flume with a sheet of filter fabric. The fabric shall be of sufficient width so as to be tightly banded around the sewer pipes and the flume pipe. The fabric shall be geo-textile fabric of polyester, polypropylene, stabilized nylon, polyethylene, or polyvinylidene chloride meeting the following specifications:
- Grab strength: 400 lb. minimum in any principal direction (ASTM D1682)
  - Mullen Burst Strength: Minimum 600 psi (ASTM D774)
  - The fabric shall have an opening no greater than a number 140 US Standard Sieve, and a minimum permeability of 25 gpm/sq.ft. (Multiply the Permittivity in Sec. from ASTM D4491-85 Constant Head Test using the conversion factor of 74.)

#### 4. PAYMENT

Erosion Control as herein before prescribed, required, and performed will not be separately measured for payment, but will be considered **incidental** to other

items in the contract unless there is a separate bid item specifically for erosion control. Maintenance of any erosion control item shall be considered **incidental**.

#### D. PROTECTION OF TREES AND SHRUBS

**No trees, shrubs, or any other vegetation shall be removed without the written permission of the Engineer.**

Unless specifically shown on the plans, or otherwise directed by the Engineer, it is the intent of the work operations under this contract to make every effort to preserve and protect trees and shrubs from damage or removal within the limits of, and adjacent to, the work included in the contract. The Contractor shall take all necessary precautions to protect trees, shrubs, and roots at the work site. Any costs associated with this work and work described within this section shall be considered incidental unless otherwise noted or directed by the Engineer.

There are, at various locations on the project, existing trees and shrubs which will require special care and protection during the removal and subsequent construction of new pavements, curbs, drive approaches, and walks. Prior to beginning construction operations for the removal and/or replacement of these contract work items, the Contractor shall conform to the following procedure:

The Contractor shall, prior to construction, conduct a detailed walk-through field inspection of all potential conflicts of the contract work with trees and shrubs within and adjacent to the project limits. The Contractor shall not excavate or cut the roots of trees or shrubs unless so indicated by the Engineer's written order or explicitly noted on the plans.

##### 1. ROOTS

Root foundations must remain adequate to withstand heavy windstorms. To protect the immediate portion of the tree roots, a Root Protection Zone shall be maintained. This zone is 5 feet on each side of the edge of the tree trunk parallel with the street and from the backside of the curb to the backside of the walk. No construction equipment or materials, sand, soil, gravel, block, or pipe shall be placed, parked, or stored within this area. All cutting for the removal of sod and soil in order to establish a finished grade within this zone must be done manually. No excavation shall occur within this zone unless otherwise directed on the plans or by the Engineer.

Tree roots interfering with the work shall be completely severed with a clean, sharp tool e.g. axe, or chainsaw, and removed with an approved machine or other approved methods. All old walk shall be removed prior to root cutting.

- a. SIDEWALKS: The root system on the walk side of the tree shall not be cut by means of mechanical root cutting machines. If root removal is essential to concrete walk replacement, interfering roots shall be manually cut with hand implements. Roots below the proposed walk shall be removed only to a depth of 9 inches below the proposed elevation of the new walk surface. The cut must be within 2 inches of the edge of the proposed sidewalk to avoid cutting

too close to the trunk of the tree. All roots within 2 inches of the bottom of the proposed sidewalk must be removed.

All debris from the root sawing and/or tree removal operations shall be removed from the sidewalk area and root sawing trenches filled with approved topsoil before the end of the work day. All exposed and severed tree roots shall be immediately covered with mulch and watered to prevent drying until such time that the concrete work is complete, the forms removed, and the area between the tree and concrete work backfilled with approved topsoil.

Stumps and roots shall be ground by an Engineer approved mechanical grinding machine to a depth of 18 inches below the proposed ground elevation. Other methods of grubbing may be used only with the approval of the Engineer. All grubbing holes shall be cleaned of chips and grindings and filled with approved compacted backfill, with at least the top 3 inches being topsoil. All debris from root sawing and/or tree removal operations shall be hauled from site and disposed of in a reasonable amount of time, as determined by the Engineer, and in accordance with any Federal, State, or Local regulations.

Dead, diseased, infected, or infested trees may not be hauled away until a permit has been obtained from the City Forester. No fee will be charged for the permit. Clearing and grubbing shall conform to Section 201 of the current State Specs.

If, in the Engineer's opinion, if it is necessary to alter the methods of construction in the plans to preserve trees and shrubs, the Contractor shall make such changes as directed. Such adjustments may include, but are not limited to, curb, sidewalk, and drive approach dimension changes, including horizontal and/or vertical alignment.

If the Engineer determines that damage to trees has occurred due to negligence of the Contractor, or failure to comply with above procedures and as directed by the Engineer, the Contractor shall be held liable for the basic formula value of such trees, based on caliper size, with such amounts to be deducted from the monies due under the contract (see following Table on the next page).

BASIC FORMULA VALUE OF TREES BASED ON CALIPER SIZE

<u>TRUNK</u> (Diameter)	<u>CROSS-SECTION AREA</u> (Square Inches)	<u>BASIC VALUE</u> (U.S. Dollars)
2		85.00
4		230.00
6		415.00
8		625.00
10		780.00
12	113	3,051.00
13	133	3,591.00
14	154	4,158.00
15	177	4,779.00
16	201	5,427.00
17	227	6,129.00
18	254	6,858.00
19	284	7,668.00
20	314	8,478.00
21	346	9,342.00
22	380	10,260.00
23	415	11,205.00
24	452	12,204.00
25	491	13,257.00
26	531	14,337.00
27	573	15,471.00
28	616	16,632.00
29	661	17,847.00
30	707	19,089.00
31	755	20,385.00
32	804	21,708.00
33	855	23,085.00
34	908	24,516.00
35	962	25,974.00
36	1,018	27,486.00
37	1,075	29,025.00
38	1,134	30,618.00
39	1,195	32,265.00
40	1,257	33,939.00

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Diameter: measurements taken 4.5 ft. (1.4m) above ground level.

Basic values established at \$27.00 per square inch cross-section of trunk. Basic price based on industry survey and U.S. Department of Labor Consumer Price Index.

## F. PROTECTION OF STREET LIGHTS AND TRAFFIC SIGNALS

All electrical work shall, where pertinent, conform to the Wisconsin Electrical Code and good electrical construction practices.

Where there is enclosed or unenclosed lighting cable within the project limits, care must be exercised by the Contractor to avoid damage to the cable during work. Where the Contractor or any of his Subcontractors damage any part of the lighting system which results in identifiable fault in the wiring, inoperative street lights or traffic signals, or an outage has occurred anywhere within the project limits, the damage shall be repaired by a qualified electrician **at the Contractor's expense** in accordance with City specifications. All lighting systems shall be kept 100% operational.

### 1. TIME LIMITS FOR REPAIRS

The Contractor shall have **24 hours** from the report of a problem in the existing or permanent lighting system to inspect and identify the cause, and **2 hours** for a temporary system (if applicable). Repairs shall be made no later than **3 days** after the problem is identified. Should these limits be exceeded, the Engineer reserves the right to hire a third party, independent of the Contractor, or use City workers to perform the repair(s). The cost of hiring a third party or using City workers and having them repair the damage will be paid for by the Contractor. Contractor agrees they will be informed of the final cost, which will be deducted from monies owed in a subsequent payment. In lieu of hiring a third party or using their own staff, the Engineer may also choose to fine the Contractor \$100, to be charged each day the lights are not properly functioning outside of aforementioned time limits, and to be deducted from monies owed to the Contractor.

### 2. TEMPORARY LIGHTING

If no plans for temporary lighting are included in the Contract Documents, the Contractor may choose, at their own expense, to maintain street lighting via overhead connections to existing poles, the installation of temporary poles and luminaires with their own wiring, or splicing (in existing wires only) around new and/or old pole bases as needed.

**Any repairs and/or replacements made by the Contractor shall be incidental to the contract unless otherwise stated as a separate base bid item.** Repairs shall be investigated and completed promptly in accordance with City of Wauwatosa specifications, or as instructed by the Engineer if no lighting specifications are included in the Contract Documents. The City may require temporary repairs **at the Contractor's expense**, including the installation of overhead facilities, to accelerate the return of functional electrical systems. Backfilling of the repair locations must not be done until all needed repairs have been made and inspected by the City Electrical Supervisor.

Splices in poles shall be made with reusable set-screw type connectors. Penn Union SX-2 or approved equal, copper service entrance connector, or approved equal. Complete splice with layer of nonstick varnished cambric insulating tape, followed by multiples laps of Scotch 130C rubber insulating tape, followed by multiple laps of Scotch Super 88 vinyl insulating tape. Split bolt compression connectors are not acceptable for this contract.

When applicable, cable work at existing conduit locations damaged during construction is to be corrected by utilizing newly placed conduit which has been laid as part of the contract work. Frost loops of at least 12 inches shall be provided where cables enter conduit systems. **Any direct-buried cable must be enveloped with mason sand.**

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## **SECTION 610 – SEWER AND WATER CONSTRUCTION**

### **SECTION 610.1 - CONSTRUCTION OF SANITARY AND STORM SEWERS AND LATERALS**

New sewer and water construction must be completed prior to the general pavement removal operation.

Inlet shapes are to be altered in accordance with the iron to be used. Masonry shims on sewer structures must fully cover the masonry below. The pitch across the frame should be set to match the concrete curb and gutter cross-section.

Trench work shall not begin so far in advance of rough grading work that the gravel backfill will require more than a 6 week maintenance interval. The Contractor will be required to maintain the trench area during the interval as incidental to the work, by keeping it to grade and spreading calcium chloride, if necessary, for dust control. Aggregate slurry backfill must be used if excavation is to be paved over in less than 10 calendar days or as indicated on the plans. All sewer structure work shall be done in accordance with the Standard Specs and the City Specs.

Excavation and backfilling relating to utility installation is incidental to the utility bid item.

#### **610.1.01 - EXCAVATION**

##### **A. GENERAL**

Excavation required for this work for the most part is unclassified. Complete all excavation regardless of the type of materials encountered. The Contractor shall make their own estimate of the kind and extent of the various materials which will be encountered in the excavation, including the presence or absence of water. The surface type as shown on the plans is presented only as a guide for the Contractor and does not guarantee the type or depth of material beneath the surface course. No additional compensation will be made for differing surface materials. No additional compensation will be made for any rails, ties, or other unknown structures and objects that may be encountered. The Contractor may make written requests to the Engineer for exceptions to this rule, however the Engineer is under no obligation to approve exceptions.

The Contractor shall expose both ends of spot relays before commencing any pipe laying so that line and grade may be adjusted. The Contractor shall provide proper traffic and safety control measures. No additional compensation will be made.

If a concrete cradle, cap, or envelope exists on any sewer to be removed and it is not noted on the plans, payment for the removal will be at 80% of the rate for rock excavation shown in the Schedule of Fixed Extras. The fixed extra price will include all additional costs including, but not limited to, any additional labor, material, time, equipment, excavation, backfill, shoring, bracing, pavement removal and

replacement, fees, and trucking. Excavation by hand means the use of pneumatic hand tools. Mechanical excavation requires the use of special attachments on excavators.

These prices will be used for removals up to 40 linear feet. If the concrete cradle, cap or envelope extends for greater lengths, a price for the remainder of the removal shall be mutually agreed upon with the Engineer before the Contractor continues. When computing the volume removed, no subtraction will be made for the cross-sectional area of the existing pipe. If the concrete cradle, cap, or envelope are shown on the plans, the price of removal should be included in the price for the sewer relay.

The spot relay shall be in a straight line grade from the downstream end of the existing pipe to the upstream end. Additional piping removed and replaced in order to provide positive drainage to the downstream end will be paid at the contract price for a longer spot relay or at the spot relay per foot price when the relay exceeds 25.5 linear feet. The pipes coming into and going out of the spot relay shall be checked with a hand level to make sure that they do not back pitch. Additional pipe should be removed to eliminate back-pitch and will be incidental the spot relay/repair.

The location, size, and elevation of all underground structures shown on the plans have been located to a reasonable degree of accuracy, but the City does not guarantee their exact location and data or the location and data of others not shown. Concrete support columns shall be placed on all sewers where shown on the plans and at all other locations not shown where a utility in a rigid conduit is discovered to pass beneath the new sewer by less than 12 inches. Concrete support columns shall be formed. Bank pouring of concrete support columns will not be permitted. The costs of these supports will be considered incidental to the contract.

Bridging, where needed or where directed to be placed, shall be provided and installed by the Contractor at no additional cost to the City.

**If any damage occurs to an underground facility, or the damage is found to exist, such that the protective coating of an electrical line is penetrated or gases or liquids are escaping from a broken line which endangers life, health, or property, the Contractor shall immediately call "911" to report the damage location. This call shall be made prior to contacting the utility involved.**

## **B. PREPARATION OF RIGHT-OF-WAY**

Should any tree, shrub, or plant that has been disturbed or otherwise damaged by the Contractor die within one year from the time that it was disturbed or damaged, they shall replace such tree, shrub, or plant in kind and size or satisfactorily compensate the property owner. Proof of satisfactory compensation to a property owner shall be a written release from the property owner to the Contractor, a copy of which shall be provided to the Engineer.

## C. REMOVAL OF PAVEMENT & CURB

Saw all pavements, curb, and sidewalk prior to removal as incidental to the work unless otherwise noted as a base bid item. All concrete or asphalt over concrete base shall be sawed to the full depth of the concrete except where noted on the plans, and in accordance with Chapter 2.2.6 and File No. 1 of the Standard Specs.

Bituminous pavement, or asphalt wearing courses, shall be sawed before being removed. The width of pavement cut shall be sufficiently sized to allow for a minimum of an 8 inch undisturbed ledge on each side, where gravel backfill is used. Curbs and sidewalks shall be completely removed to existing expansion or scored joints sawed full depth, or as directed by the Engineer.

The Contractor shall use appropriate concrete breaking machinery to minimize disruption to nearby residents and businesses.

## D. SALVAGED MATERIALS

Existing iron on structures to be abandoned or rebuilt shall be removed by the Contractor using reasonable care. These salvaged items will become property of the City and shall be delivered to the City's Public Works Building at 11100 W. Walnut Rd. by the Contractor, even if they are damaged or broken. The Contractor shall be fined \$20 per frame, lid/cover, and back-box which is unaccounted for at the end of the project, to be deducted from monies owed to the Contractor. **Internal manhole chimney seals shall be removed and disposed of by the Contractor as incidental to the work.**

## 610.1.02 - LAYING OF PIPE

### A. BEDDING, COVER, FOUNDATION AND BACKFILL MATERIAL

All sewer pipe shall be laid in a Standard Section, Class "C" bedding of crushed limestone conforming to File No. 3 and Table 32 or Table 38, as applicable to size and type of pipe material, of the Standard Specs, with modifications as specified in Section 3.2.6(i) for PVC pipe of the Standard Specs, unless otherwise noted on the plans. Cover material for pipe shall be the same as that specified for bedding. Risers which do not require a concrete envelope shall be bedded (i.e. surrounded by bedding material) all the way to the top of the riser, and special care shall be taken to "tuck" the bedding tightly around the entire lateral assembly for all laterals to prevent future settling.

Backfill used on this contract for sanitary and storm sewer work shall be either mechanically compacted (unless directed to use flooding by the Engineer) crushed recycled concrete 1-1/4 inch dense meeting the gradation requirements for granular material as specified in Table 37 in Section 8.43.4 of the Standard Specs, or aggregate slurry backfill as specified in Section 8.43.8 of the Standard Specs. The

backfill shall be consolidated by mechanical compaction of the trench backfill as specified in Section 2.6.14(b) of the Standard Specs unless otherwise specified by the Engineer.

Lumps of clay, loam, spoils (unless otherwise stated), garbage, organic material, or any other material the Engineer deems unsuitable are not allowed in the backfill, and the Engineer reserves the right to order the Contractor to remove such items from the trench before paving commences, at the Contractor's expense, should the pieces be deemed unreasonably large and/or numerous. Material resulting from incidents such as, but not limited to, trench wall collapses is NOT excluded from this rule. For instances where the Contractor does not remove unacceptable backfill when directed, they shall be charged a percentage of the price for the pipe over the lineal footage in which the fill is present, to be deducted from monies owed to the Contractor.

## B. PIPE AND FITTINGS

Except for lateral reconnections, sizes and strength classifications of sanitary sewer pipe to be used in all locations are indicated on the plans.

**All wyes and tees shall be moulded as a single piece only. No wyes or tees with glued and/or fused pieces will be accepted unless the Contractor is given the written permission of the Engineer.**

PVC pipe shall conform to ASTM D-3034 SDR35, Type PSM, rubber gasket joints, or ASTM F-789 Type PS-46 for sizes 4 inches through 15 inches and F-679 (T-I) 12454 Type PSM rubber gasket joints for sizes 18 inches through 27 inches. Where PVC pressure pipe is called for on the plans, it shall conform to AWWA C900, Pressure Class 150 (PC150) DR18. Joints shall use elastomeric gaskets.

All concrete pipe to be used for storm sewer on this project shall be reinforced concrete pipe, ASTM C-76 or ASTM C-507, or of the class shown on the plans. Reinforced concrete horizontal elliptical pipe 18 inch or larger in diameter shall conform to ASTM C 507 and of the class as shown on the plans. All reinforced concrete pipe catch basin or inlet leads, regardless of size, shall be ASTM C-76 Class V. Pipe furnished under this classification as manufactured by American Concrete Pipe Co., Inc., Milwaukee and Green Bay, WI, Madison Concrete Pipe, Inc., Madison, WI, County Concrete Corp., Marathon, WI, or equal, shall meet the requirements set forth in ASTM C-76 with "B" or "C" wall for circular pipe and any additional requirements set forth herein and in Chapter 8.6.0 of the Standard Specs. Joints shall use rubber gaskets except for horizontal elliptical which may be either rubber gasket or mortar joints.

Temporary repairs for storm sewers which are to be replaced before the completion of the project may be made with PVC class SDR35 pipe, and the joints may be made by any reasonable means to prevent leaking and backups before the future replacement, at the discretion of the Engineer. Permanent storm spot repairs which

were not originally called for on the plans or in a change order may be made with PVC C900 pipe with antihydraulic mortar joints if the Contractor does not wish to use RCP, with the permission of the Engineer and at no additional cost to the City.

Joints for concrete storm sewer reducers and bends shall be submitted to the Engineer and approved prior to construction as part of the shop drawing review.

The Contractor shall bear all costs of testing and shall submit copies of these test reports to the Engineer prior to any pipe installation.

### C. JOINTS BETWEEN DISSIMILAR PIPE MATERIALS

When field cutting and/or machining the pipe is necessary, use only tools and methods recommended by the pipe manufacturer and approved by the Engineer. Breaking and chipping the pipe with a wrench, pliers, or a hammer will not be allowed.

Connect dissimilar pipe materials by means of a non-shear flexible compression coupling as specified below for sanitary sewer and for storm sewer, or a concrete closure collar for storm sewers as directed by the Engineer. Install couplings in strict accordance with the manufacturer's recommendations.

Joints on sanitary sewers between dissimilar pipe shall be either a non-shear coupling as manufactured by DFW/HPI or shall be made with flexible mechanical compression joint coupling conforming to ASTM C-594 Type B with stainless steel bands and shear ring conforming to ASTM A-167 as manufactured by Joints, Inc. (Calder) of Gardena, CA, Fernco Joint Sealer Co. of Ferndale, MI., or equal, and in addition using a transitional bushing conforming to ASTM C-594 Type B when pipe with different outside diameters are to be connected.

Joints on storm sewers between dissimilar pipe may be made with either a non-shear flexible mechanical compression joint coupling with No. 305 stainless steel bands or, where this is not possible, a concrete closure collar as shown on the special detail with prior approval of the Engineer.

Use concrete closure collars only on nonflexible pipe storm sewers and when approved by the Engineer, and then only to make connections between dissimilar pipe when standard rubber gasketed joints, mortar, or flexible couplings are impractical.

Before the closure collars are poured, wash the pipe to remove all loose material and soil from the surface on which the concrete will be placed. Wet nonmetallic pipe thoroughly prior to pouring the collars. Wrap and securely fasten a light gauge of sheet metal or building felt around the pipe to insure that no concrete shall enter the line. Place reinforcement as needed. Make the entire collar in one pour using 3000 psi concrete and extend a minimum of 12 inches on each side of the joint. The minimum thickness around the outside diameter of the pipe shall be 6 inches. No

collar shall be poured in water. After the collars are poured and have taken their initial set, cure by covering with well-moistened earth. Refer to a special detail drawing(s), if provided.

Payment for connecting dissimilar pipe materials with flexible couplings, non-shear couplings or, when approved by the Engineer, concrete closure collars shall be included in, and incidental to, the prices for pipe stated in the bid unless otherwise noted as a separate item.

#### D. ABANDONED SEWERS, DRAINS AND SEWER STRUCTURES

Where the plans call for a sewer to be abandoned, the Contractor has the option to either remove or abandon the sewer by bulkheading the ends and filling the pipe with concrete grout as specified in Sections 8.35.4 or 8.35.5 of the Standard Specs, or as directed or approved by the Engineer. Direction of the use of Elastizell PS120 which is not called for on the plans or included in a bid item description shall be paid as an extra cost to the Contractor per cubic yard of material installed.

Bulkheads shall be as specified in Chapter 3.2.25 of the Standard Specs. Where the plans call for removal, the Contractor shall remove the entire pipe including any concrete support and backfill with the material as specified. The cost of this work shall be incidental unless otherwise specified as a separate bid item.

Manholes shall be removed or abandoned where specified or shown on the plans. As with sewers, the Contractor has the option to remove structures which are identified for abandonment but must remove those identified to be removed. The removal shall include the base of the structure. Manhole caps shall be used in the abandonment of sanitary or storm sewer structures and shall be made to the satisfaction of the Engineer. Where a cap is used, the manhole shall be filled with slurry or other suitable materials at least 4 feet below the proposed finished grade. This work shall be incidental to the contract unless noted as a separate bid item.

#### E. INSULATION AROUND WATER MAINS & APPURTENANCES

The Contractor shall provide and install extruded polystyrene rigid insulation with a minimum of 25 PSI compressive strength, two layers of 2 inch thick by 6 feet long by the width of the trench, between storm sewer and structure installations and all water mains and services at all locations shown on the plans, and at any other location where a water main or service is exposed. Insulation shall also be placed above storm sewers where they cross under water mains and services with less than 12 inches of separation, or as directed by the Engineer. Include costs with the price of the storm sewer relay, repair, extension, or structure, or water main relay, repair, or extension. If the vertical separation is greater than 12 inches and the service or main has a minimum of 6 feet of cover, the insulation need not be installed at locations which are not shown on the plans. Insulation shall be incidental to the work unless noted as a separate bid item.



## F. CONNECTION TO EXISTING STRUCTURES

Where the sewer relay, repair, or extension begins or ends with a connection to an existing structure, the Contractor shall remove existing pipe and masonry from the structure as needed to make the new connection. The Contractor shall install an Engineer approved flexible water tight pipe-to-MH seal ("boot") for all sanitary sewer and other flexible pipe connections. For rigid pipe storm sewer connections, the Contractor may mortar the pipe into place. The structure's paved invert shall also be modified and rebuilt as needed. All costs shall be included with the price of the sewer unless noted as a separate bid item.

### 610.1.03 - BUILDING LATERAL SEWERS AND STORM WATER DRAINS

#### A. GENERAL

The size, type of material, location, and direction of existing building laterals and the approximate distances from the nearest existing downstream manhole are shown on the plans and on the TV inspection logs, available for inspection at the City Engineering Division upon request. The Contractor shall be responsible for locating and verifying the size and type of material of each existing building lateral in the field. This shall include dye testing or electronic locating methods where necessary. This shall be incidental to the work and no additional compensation will be made for the location process or delays caused by this verification.

Make all lateral reconnections in accordance with the details shown in the plans. Materials to be used for this work shall be as specified in Chapter 3.4.0 of the Standard Specs, amended as follows: The material to be used shall be of equal size of the existing lateral and of the same material as the relayed mainline sewer unless otherwise specified on the plans.

Adaptors, couplings, and connectors shall be watertight and as shown on the plans, or shall be approved by the Engineer. Joints shall be rubber gasket as approved by the State and local plumbing code. Cement mortar or glued joints are not acceptable.

Excavation and backfill shall conform to the applicable requirements of Chapter 3.4.0 of the Standard Specs and as herein modified. The maximum trench width shall be the outside diameter of the pipe plus 24 inches. Bedding shall be the same as required for the mainline. Backfill in the pipe zone shall be the same as required for mainline repair.

Install lateral reconnections in accordance with the applicable requirements of Chapter 3.4.0 of the Standard Specs. Use factory fabricated wyes or tees without glued or fused pieces. Provide bends, suitable lengths of straight pipe, and joints for dissimilar pipe as required. The minimum slope of the lateral reconnection shall be 1/4 inch per foot. Sanitary lateral reconnections which are to be extended shall be

laid at normal depth for a new lateral with the adjustment to the existing grade of the lateral being made beginning at 5 feet from the back of curb or where directed by the Engineer.

## B. LATERAL AND SUMP PUMP COLLECTOR SYSTEM TRACER WIRE WITH ACCESS BOX

This section shall only be applicable where shown on the plans or directed by the Engineer, and shall be incidental to the cost of lateral installation.

### 1. DESCRIPTION

When stated on the plans or directed by the Engineer, building sewer laterals and sump pump collector systems shall be installed with a tracer wire in accordance with the State of Wisconsin Administrative Code Chapter SPS 382.30(11)(h). This code requires that all new, non-metallic building sewers (including sanitary, storm, sump pump collector systems and private sanitary sewers) and water services installed must be accompanied by a means of locating the underground pipe.

- a. A pipe locator conductor (tracer wire) shall be installed on all non-metallic (PVC, PE, clay, concrete and other non-metallic) sewer laterals and sump pump collector systems within the limits of the project as noted on the plan or directed by the Engineer. The conductor shall be placed along the top of the sewer lateral pipe from the sewer main or structure up to the property line or the end of the installation beyond the roadway as directed by the Engineer. On sump pump collector systems, the conductor shall run from the storm structure to the clean-out and from clean-out to clean-out or as directed by the Engineer.

**Wrapping of the tracer wire on the pipe is prohibited.** The conductor shall be held in place with ties or hitches spaced no more than 10 feet apart. The ties or hitches shall be spaced no more than 10 feet apart. The conductor shall be a minimum of 12-gauge standard solid copper wire with a green PVC or 30 to 45 MIL of Polyethylene coating to prevent corrosion. The wire shall be rated for buried and wet conditions. The conductor itself will be one continuous loop with the two wire ends connected to the tracer wire access box.

- b. The tracer wire shall be brought to the surface at the property line, end of the lateral installed, at each sump pump collector system clean-out, or at a location directed by the Engineer within a covered access device. The covered access device (tracer wire access box) may be a terminal box, valve box, a small diameter PVC conduit or a cleanout. Within the covered access device, the Contractor shall provide an extra 18 inches of wire. The lid of the covered access device shall have "SEWER" permanently engraved on it by the manufacturer. The lids shall be cast iron accompanied with connection

holes where the Contractor shall connect the tracer wire with stainless steel terminal bolts. The lid shall be bolted with a standard pentagonal head key.

- c. Please be aware that below grade splices are prohibited.
- d. Each tracer wire shall be field tested after installation is complete.
- e. The Valvco Tracer Wire Access Box (<http://www.cptest.com>) and the Bingham & Taylor Cathodic Test Box (<http://www.binghamandtaylor.com/cathodic.htm>) are considered acceptable devices for this specification.

## 2. METHOD OF MEASUREMENT

Sanitary Lateral Tracer Wire with Access Box shall be measured by each completed unit. The price for this item shall include all labor, material (wire, tape, box, and cover) and equipment necessary to install and test the unit.

## C. PAYMENT FOR SEWER LATERALS

Payments will be made as specified in Section 601.

### 610.1.04 - MANHOLES

The Contractor shall be responsible for cleaning all sewer and water structures in the project area of all debris at their own expense.

#### A. INVERTS

Benchs on all manholes shall be constructed at a minimum up to the crown of each pipe and sloped as specified for a sanitary or storm manhole as needed. Refer to File No.s 11 and 12 of the Standard Specs.

#### B. CASTINGS

New frames and covers are required on all new manholes, and new frames, grates, and back boxes are required for new inlet structures unless otherwise noted on the plans, and shall be supplied by the Contractor unless otherwise directed in the contract or by the Engineer. All castings shall be considered incidental to the applicable structure item unless otherwise stated as separate bid items.

Sanitary sewer manhole covers shall be self-sealing with an o-ring gasket and of a non-modernized design. The cover shall weigh approximately 143 pounds. They shall be Neenah R-1661-B or equal. They shall have two concealed pick holes. **The City of Wauwatosa will furnish these self-sealing covers only (not the frame),**

**unless specified otherwise. The Contractor shall pick them up at the Municipal Public Works Building at 11100 W. Walnut Road and install them. The contractor shall call 414-471-8422 a minimum of 1 day prior to picking up the materials. The Contractor shall provide all labor & equipment necessary to load the materials and deliver them from the DPW Yard to the jobsite.**

Storm sewer manhole covers shall be as shown in the plan details or equal and of a non-modernized design. The cover shall weigh approximately 152 pounds. Single and double storm sewer inlets shall be as shown in the plan details or equal and of a non-modernized design.

Frames for sanitary and storm sewer MHs shall be compatible with the covers and also be of a non-modernized design. Frames shall weigh approximately 369 pounds.

All manhole frames, iron rings, covers, storm water inlet or catch basin frames, grates, and back boxes which are removed from existing structures and are not reused shall remain the property of the City. The Contractor shall deliver these to the Municipal Public Works Building at 11100 West Walnut Road, Wauwatosa. WI.

#### C. FRAME/CHIMNEY JOINTS AND SEALS

Unless the manholes are to be adjusted and set to grade under a separate contract, the frame/chimney joints shall be as specified in the Standard Specs. Sanitary sewer manholes shall be constructed with a Type I, flexible watertight frame/chimney joint as detailed in Section 3.5.4(f)1.(a) of the Standard Specs. Seals shall be incidental to any manhole work unless otherwise stated as a separate bid item.

The Engineer approved manhole frame/chimney seal, where required, shall consist of a flexible rubber sleeve, overlapping extension or extensions as needed, and stainless steel bands, and shall extend from the frame to the cone of the new manhole to insure the chimney is fully covered. They shall be furnished and installed by the Contractor and shall be an internal rubber sleeve as manufactured by Cretex Specialty Products, N16 W23390 Stoneridge Drive, Suite A, Waukesha, Wisconsin, 53188, NPC, Inc., 250 Elm Street, PO Box 301, Milford, NH 03055 or Engineer approved equal. The Contractor shall use the proper tools for installation of the seals.

If it appears a flexible rubber seal will not fit or function properly in a manhole, and the Contractor has permission from the Engineer, a mastic seal or equal may be spread on the chimney in lieu of installing the rubber one. The Engineer must be present at the time of installation to verify all chimney joints were thoroughly covered.

##### 1. SURFACE PREPARATION

Surface preparation shall be as follows or as recommended by the manufacturer if their requirements are more stringent:

- a. Remove manhole cover and allow any accumulated fumes to dissipate, open additional manholes or use blower to ventilate, if necessary.
- b. Power wire brush the lower 3 inches of the manhole frame to remove any loose rust or scale and repair any imperfections by either grinding smooth or filling with mortar. A reasonably smooth, clean sealing surface is required.
- c. Realign the casting if it is offset more than approximately 2 inches from the chimney.
- d. Make a visible line or series of alignment marks around the frame 2-3/4 inches up from the bottom edge of the frame for normal positioning. The sleeve can be installed higher in the frame if necessary, in which case the marks should be raised accordingly.
- e. Provide a 4 inch wide sealing surface on the manhole cone deck (i.e. not on the adjusting rings). Remove all loose and protruding mortar and brick as needed to provide a sealing surface.
- f. All sealing surfaces must be circular, reasonably smooth, clean and free of any loose material or excessive voids. If such a surface does not exist for the bottom of the sleeve to seal against, the Contractor shall prepare one. The Contractor shall use one-component, quick-set, high-strength, non-shrink, polymer modified patching mortar which has been formulated for vertical or overhead use to prepare the uniform vertical sealing surface.
- g. If the bottom of the sleeve is to seal against the top of an eccentric (straight side) cone and an inadequately high vertical surface does not exist, the contractor shall contact the manufacturer to obtain details for building the required vertical surface.
- h. If any caulk is used to fill minor irregularities in the bottom sealing surface, the caulk shall be a butyl rubber caulk conforming to AASHTO M-198, type B. When used, the Contractor shall apply a single bead of the caulk to the center portion of the lower sealing surface of the sleeve. The Contractor shall not use any other type of caulking material. Caulk is considered incidental to the seal installation and the Contractor will not be paid extra for it.

## 2. CRETEX INTERNAL MANHOLE FRAME CHIMNEY SEAL INSTALLATION

The Contractor shall also refer to the manufacturer's literature for additional installation variations and options.

- a. Install the rubber sleeve with the printing at the top and line the top edge up with the previously applied marks. Any flaws in the manhole frame, such as minor cracks, pits or protrusions, shall be repaired by either filling with mortar or grinding smooth.

- b. Lightly lubricate the outside of one stainless steel band with gasket lube and install it in the lower band recess so that the slotted end laps over the end with the studs and the studs extend through the adjustment slot. Put on the self-locking nuts and tighten sufficiently to draw the lapped ends of the band close enough to allow the attachment of the expansion tool. Position the expansion tool and expand the band as required to provide a watertight seal and tighten the two lock nuts.
- c. Conduct a water leakage test on the lower band under the supervision of the Engineer. The Engineer shall determine how much water should be used for a proper test and shall decide if the seal passes or fails. If it fails, the Contractor may choose to re-install the lower band and repeat the test, or apply a bead of butyl rubber caulk, conforming to AASHTO M-198, Type B, to the lower sealing surface of the sleeve to fill any minor irregularities in the masonry surface to the satisfaction of the Engineer present.
- d. Lubricate the second band and install it in the upper recess, attach the tool and expand as before, keeping the bands parallel and a minimum of approximately 3 inches apart. The bands can be put closer together if excessive sleeve expansion is specifically required.
- e. Check the top and bottom edges of the installed sleeve to insure that it has been properly compressed and sealed against the two surfaces.
- f. **The Engineer will not pay the Contractor for any internal manhole seals unless the Engineer has witnessed a passing water leakage test or witnessed satisfactory application of butyl rubber caulk or mastic.**

#### D. FRAME ADJUSTMENTS & MASONRY

The masonry mortar and concrete bricks shall comply with the requirements of Section 519 of the State Specs and shall be incidental to the work.

Adjustments on manhole frames must be done after the asphalt base/binder has been laid and before the surface course is laid, and shall match 1/4 inch ("string bounce") below the surface grade. Backfilling around the frames after adjustment shall be done with compacted fill as specified for the pavement base, and compacted asphalt base/binder material. Adjustments shall be incidental to the work unless otherwise specified as a separate bid item, and any adjustment bid item shall include all the labor, equipment, and materials needed.

The minimum dimensions for the pavement box-outs to perform adjustments shall be large enough to fully accommodate compaction by mechanical means. **The use non-mechanical means will not be permitted for compacting the lower layers around manholes without the express written approval of the Engineer.**

While performing the masonry work involved in making adjustments, the Contractor shall provide the means to intercept dropped materials before they reach the bottom of the structure, and shall clean the structure of any such materials at the bottom before final payment will be made. This shall be incidental to the work.

New sewer structures shall be built within approximately 4 inches of grade needed for the frame, requiring final frame setting during adjustments. Sewer structures to be in concrete pavement, at the time the surrounding concrete pavement is poured, shall have frames that are "wedged" high enough during concrete paving that the aggregates in the agitated concrete mix can move freely under the frame, and thus allow the frame to sit on solid concrete.

When additional masonry replacement is required to an extent which includes a normal step location, a new step must be incorporated as part of the work under that item. Replacement of masonry in poor condition is required even if it extends farther than listed on the plans. Sanitary manhole masonry work must be performed before the installation of internal seals.

## 1. PAYMENT

For all existing and proposed manhole, inlet, or water valve vault frame adjustments which are listed as adjustment items, the Contractor shall be paid the unit price bid for such adjustments. If separate bid items are not specified, adjustments shall be incidental to the contract, even for proposed structures and valves.

For any additional depth of manhole rebuilds required, the Contractor will be paid the unit bid price for the extra repairs.

## E. PRECAST MANHOLE JOINTS

All joints between sanitary manhole sections including base, riser(s), and cone shall be sealed with a high-strength external perimeter sealing band, consisting of a heavy polypropylene backing, rubberized mastic seal, woven polypropylene reinforcing, and heavy-duty steel straps, under the supervision of the Engineer. The external seal shall allow the manhole structure to pass the ASTM C-1244 vacuum test as described in Chapter 3.7.6 of the Standard Specs (see section 610.1.07 C of the City Specs for internal chimney seals). External perimeter sealing band shall be Mar Mac MacWrap or approved equal. Vacuum test shall be performed after all seals are in place, under the supervision of the Engineer, who will decide if it passes.

For sanitary manholes which have an outside drop, an Engineer approved mastic seal shall be used in lieu of Mar Mac MacWrap for all joints which are non-circular around the full perimeter of the manhole at the applicable joint(s). This mastic seal shall also be installed on other non-circular joints at the direction of the Engineer.

All external joint sealing shall be incidental to the cost of the manhole, regardless of sealing method, unless otherwise noted as a separate bid item.

#### F. BYPASS PUMPING

Contractor shall submit bypass pumping plans for review by the Engineer at least 3 business days prior to the work. A bypass pumping plan is required for ALL bypass pumping that occurs. The Contractor shall notify the Engineer 24 hours prior to commencement of the bypass pumping operation. The Contractor's plan for bypass pumping shall be approved by the Engineer before the Contractor will be allowed to start bypass pumping. This shall be incidental to the utility work.

#### G. MANHOLE CONNECTIONS

Where a new manhole is to connect to an existing sewer that will not be relayed at a later point in the project, up to the first 6 linear feet of pipe used in this connection shall be included in the price of the new manhole and considered incidental to the work.

If the existing pipe is found to be in poor condition, the Contractor shall inspect it to find how much farther they must dig to expose a section in at least acceptable condition. If the length is reasonably short, the Contractor shall be paid for each linear foot of pipe used beyond the initial 6 feet of connection. If the next acceptable pipe is unreasonably far away, the Contractor shall seek instructions from the Engineer for how to proceed.

#### 610.1.05 - CATCH BASINS, STORM WATER INLETS & INLET MANHOLES, AND STORM WATER DRAINS

Storm water inlets and inlet MHs shall be constructed in conformance with File No. 11, 12, and 28 of the Standard Specs modified so as to accommodate the required frame (refer to the standard details and special provisions on the plan), and shall include a 6 inch stub for future lateral connection and a 4 or 6 inch stub for future underdrain connection at locations and directions as shown on the plans or as directed by the Engineer. The cost of these stubs shall be included in the unit price bid per inlet. These stubs shall be made of PVC SDR35 pipe.

The frame, grate, and curb box shall be furnished by the Contractor. The specific casting to be used on the job will be noted on the plans and listed in the special provisions of each individual contract. Castings shall be incidental to the structure unless otherwise noted as a separate bid item.

Storm water inlet manholes shall have a poured bench meeting the requirements of a standard manhole. Where the plans call for the construction of a storm water inlet rather



than a manhole or inlet manhole on a storm sewer, the inlet shall also have a paved invert as specified for a standard MH.

Where the depth of the manhole is too shallow to accommodate the standard cone top section, a flat top slab shall be substituted for the cone and shown in the shop drawings. The steps and cover shall be to the side identified on the plans as the straight side. No additional compensation will be given for this change. Payment will be at the per vertical foot bid and contract price.

Underdrains, to be installed where indicated on the plans, shall be 6 inch perforated PVC wrapped in geotextile fabric (a "sock"), and be in accordance with section 612 of the State Specs. Bedding of 3/8 inch limestone chips shall be used around the entire pipe and be in accordance with Table 32 of section 8.43.2 of the Standard Specs.

#### 610.1.06 - ACCEPTANCE AND QUALITY CONTROL OF SANITARY AND STORM SEWERS

##### A. FINAL SEWER CLEANING

Prior to final acceptance of the sewer system by the Engineer, flush and clean all parts of the system. Remove all accumulated construction debris, rocks, gravel, sand, silt, and other foreign material from the sewer system at or near the closest downstream manhole. If necessary, use water jet, mechanical rodding or bucketing equipment. If any foreign matter is still present in the system upon final televised inspection by the Contractor, re-flush and clean the sections and portions of the lines as required.

The Contractor shall also submit a written report of the sanitary sewer cleaning. This report shall identify the sewer segments cleaned and the type and volume of debris removed from the sanitary sewers.

##### B. ACCEPTANCE OF SANITARY AND STORM SEWER RELAYS BY CLOSED CIRCUIT TV VIDEO INSPECTION

Prior to final acceptance of any sanitary sewer or storm sewer spot relay or extended relay, the Contractor shall inspect by means of remote closed circuit television equipment the entire segment of sanitary sewer, manhole-to-manhole, on which the repair was made, not just the short length repaired out of the manhole. It is the City's intent to have all manhole-to-manhole sewer spans disturbed, replaced, or repaired as part of the contract, to be internally inspected. Sewers shall be cleaned prior to inspection and all manhole connections shall be shown. A USB external hard drive of the inspections shall be furnished to the Engineer for review and acceptance. Televising shall be incidental to the sewer work.

The following conditions shall apply to the sewer acceptance TV inspection:

1. CCTV operators shall be NASSCO trained and certified in the use of Pipeline Assessment and Certification processes and nomenclature.
2. Video shall be furnished on an external USB hard drive that will not be returned to the Contractor.
3. The TV camera shall travel through the sewer at a maximum rate of 30 feet per minute.
4. The camera shall stop at the beginning and end joint of each relay for a 10 second period.
5. The camera shall travel in the downstream in all cases.
6. The lens of the camera shall be cleaned at each MH or when directed by the Engineer.
7. The videos shall have an on-screen display showing, at a minimum, the following:
  - a. Upstream and downstream MH numbers
  - b. Footage from upstream MH
  - c. Date of inspection
8. Sewers shall not be televised within 48 hours of a rainfall event greater than 1/4 inch.
9. Jetting of pipe relay segments shall be completed no less than 30 minutes prior to televising and under normal functioning conditions.

This inspection shall be made as soon as practicable after the backfill has been consolidated. If the Contractor chooses to wait until after paving or restoring the trench surface to televise the sewer, they will be solely responsible for any costs incurred from any potential repairs required to make the work acceptable, including, but not limited to, additional restoration and/or paving.

Reasons for rejection of the relay will include but not be limited to:

- Dropped joint
- Broken joint
- Open or offset joint
- Sag in repair
- Deflected pipe
- Leaks

The Engineer shall determine if any of these conditions exist and if they are excessive enough to be considered defective and warrant replacement. If directed by the Engineer, the Contractor shall promptly, at their expense, correct all defects.

#### C. MANHOLE VACUUM TESTING

Contractor shall vacuum test sanitary manholes in accordance with the applicable requirements of Chapter 3.7.6 of the Standard Specs under the supervision of the Engineer. It is highly recommended that the Contractor test sanitary sewer manholes immediately after installation and prior to backfilling. If the Contractor chooses to wait until after paving or restoring the trench surface to vacuum test the manholes, they will be solely responsible for any costs incurred from any potential repairs required to make the work acceptable, including, but not limited to, additional restoration and/or paving.

Plug lift holes with non-shrink grout. If a manhole fails the initial test, make necessary repairs with non-shrink grout or other acceptable and approved materials. The Contractor shall continue re-testing until the Engineer determines a satisfactory test is obtained. All testing shall be incidental to the contract.

#### D. SEWER TRENCH AND MANHOLE EXCAVATION DYE WATER FLOOD TEST

The City of Wauwatosa, at its discretion, may perform dye water flood testing on all sewer trenches and manhole excavations prior to final surface restoration or final payment to identify infiltration into the system. Dye water flood testing of sewer pipe and manholes shall be in accordance with the applicable requirements of Chapter 3.7.2 Water Infiltration Test of the Standard Specs. Infiltration rates as identified in the Standard Specs shall determine pass or failure of the pipe and manholes. If a pipe or manhole fails the initial test, the Contractor shall make necessary repairs at their own expense with approved materials. The Engineer may continue re-testing until a satisfactory test is obtained.

## SECTION 610.2 - CONSTRUCTION OF WATER MAINS AND WATER SERVICES

**ALL PERMANENT WATER DISTRIBUTION PRODUCTS SHALL BE MANUFACTURED IN THE USA. NO EXCEPTIONS.** MegaLug retainer glands or equal, as approved in writing by the Engineer, shall be required at all mechanical joints.

New water construction must be completed prior to the general pavement removal operation.

If flooded trenches are directed by the Engineer, no paving shall be done over flooded trenches that have not stood for at least 10 calendar days without heavy rain. Trench work shall not begin so far in advance of rough grading work that the gravel backfill will require more than a 6 week maintenance interval. The Contractor will be required to maintain the trench area during the interval as incidental to the work, by keeping it to grade and spreading calcium chloride, if necessary, for dust control. Aggregate slurry backfill must be used if excavation is to be paved over in less than 10 calendar days or as indicated on the plans.

Backfill used on this contract for water work shall be either mechanically compacted (unless directed to use flooding by the Engineer) crushed recycled concrete 1-1/4 inch dense meeting the gradation requirements for granular material as specified in Table 37 in Section 8.43.4 of the Standard Specs, or aggregate slurry backfill as specified in Section 8.43.8 of the Standard Specs. The backfill shall be consolidated by mechanical compaction of the trench backfill as specified in Section 2.6.14(b) of the Standard Specs unless otherwise specified by the Engineer.

Excavation and backfilling relating to utility installation is incidental to the utility bid item.

### 610.2.01 - EXCAVATION

#### A. GENERAL

The Contractor will be responsible for cleaning all water structures in the Project Area of all debris.

Excavation required for this work for the most part is unclassified. Complete all excavation regardless of the type of materials encountered. The Contractor shall make their own estimate of the kind and extent of the various materials which will be encountered in the excavation, including the presence or absence of water. The surface type as shown on the plans is presented only as a guide for the Contractor and does not guarantee the type or depth of material beneath the surface course. No additional compensation will be made for differing surface materials. No additional compensation will be made for any rails, ties, or other unknown structures and objects that may be encountered. The Contractor may make written requests to the Engineer for exceptions to this rule, however the Engineer is under no obligation to approve exceptions.

If a concrete cradle, cap, or envelope exists on any sewer to be removed and it is not noted on the plans, payment for the removal will be at 80% of the rate for rock excavation shown in the Schedule of Fixed Extras. The fixed extra price will include all additional costs including, but not limited to, any additional labor, material, time, equipment, excavation, backfill, shoring, bracing, pavement removal and replacement, fees, and trucking. Excavation by hand means the use of pneumatic hand tools. Mechanical excavation requires the use of special attachments on excavators. These prices will be used for removals up to 40 linear feet. If the concrete cradle, cap or envelope extends for greater lengths, a price for the remainder of the removal shall be mutually agreed upon with the Engineer before the Contractor continues. When computing the volume removed, no subtraction will be made for the cross-sectional area of the existing pipe. If the concrete cradle, cap, or envelope are shown on the plans, the price of removal should be included in the price for the sewer relay.

The Contractor shall expose existing water mains to which the new main will be connected before commencing any pipe laying so that line and grade may be adjusted. The Contractor shall provide proper traffic and safety control measures. No additional compensation will be given.

The spot relay shall be in a straight line grade from the downstream end of the existing pipe to the upstream end. Additional piping removed and replaced in order to provide positive drainage to the downstream end will be paid at the contract price for a longer spot relay or at the spot relay per foot price when the relay exceeds 25.5 linear feet. The pipes coming into and going out of the spot relay shall be checked with a hand level to make sure that they do not back pitch. Additional pipe should be removed to eliminate back-pitch and will be incidental the spot relay/repair.

Water mains, services, branch services, and leads which are not installed to the alignment, slope, and depth as shown on the plans shall NOT be paid for or accepted by the Engineer. The Engineer reserves the right to shut down the project, at the Contractor's expense, if the Contractor or any of their subcontractors refuse to use, or are repeatedly caught not using, Standard Specs construction methods requiring properly set up lasers as guides for excavating and laying pipe. The Contractor shall check the pipe with the laser at least every other pipe section which is laid, and at every fitting and valve. The Contractor shall be required to use the same methods for laying any pressurized system pipe as they would for gravity fed pipe as outlined in the Standard Specs – NO EXCEPTIONS. Any pipes laid to the incorrect alignment, slope, or depth shall be dug up and properly re-installed at the Contractor's expense before they will receive ANY payment for ANY water system work.

The location, size, and elevation of all underground structures shown on the plans have been located to a reasonable degree of accuracy, but the City does not guarantee their exact location and data or the location and data of others not shown. Concrete support columns shall be placed on all mains where shown on the plans and at all other locations not shown where a utility in a rigid conduit is discovered to pass beneath the new main by less than 12 inches. The costs of these supports will

be considered incidental to the contract.

Bridging, where needed or where directed to be placed, shall be provided and installed by the Contractor at no additional cost to the City.

The sanitary lateral and water service relay shall be in a straight line grade from the downstream end of the new pipe to the right-of-way.

**If any damage occurs to an underground facility, or the damage is found to exist, such that the protective coating of an electrical line is penetrated or gases or liquids are escaping from a broken line which endangers life, health or property, the Contractor shall immediately call “911” to report the damage location. This call shall be made prior to contacting the utility involved.**

#### B. PREPARATION OF RIGHT-OF-WAY

Should any tree, shrub, or plant that has been disturbed or otherwise damaged by the Contractor die within one year from the time that it was disturbed or damaged, they shall replace such tree, shrub, or plant in kind and size or satisfactorily compensate the property owner. Proof of satisfactory compensation to a property owner shall be a written release from the property owner to the Contractor, a copy of which shall be provided to the Engineer.

The Contractor shall not store materials and equipment over tree roots in grounds belonging to the Milwaukee County Parks system in the area between the curb and sidewalks or bike paths, or any other County property without County permission. The Contractor shall develop a written plan for the storage of vehicles and materials at the construction site. This plan shall be submitted to the Engineer for their approval prior to starting construction. **If the Contractor wishes to use any property outside the City right-of-way, they must provide written approval from the property owner to the City.**

#### C. REMOVAL OF PAVEMENT & CURB

Saw all pavements, curb, and sidewalk prior to removal as incidental to the work unless otherwise noted as a base bid item. All concrete or asphalt over concrete base shall be sawed to the full depth of the concrete except where noted on the plans, and in accordance with Chapter 2.2.6 and File No. 1 of the Standard Specs.

Bituminous pavement, or asphalt wearing courses, shall be sawed before being removed. The width of pavement cut shall be sufficiently sized to allow for a minimum of an 8 inch undisturbed ledge on each side, where gravel backfill is used. Curbs and sidewalks shall be completely removed to existing expansion or scored joints sawed full depth, or as directed by the Engineer.

## 610.2.02 - LAYING OF WATER MAIN

### A. BEDDING COVER AND FOUNDATION MATERIAL

All water main pipe shall be laid in a standard section conforming File No. 36 of the Standard Specs unless otherwise noted on the plans. 3/8" limestone chips conforming to Table 32 of the Standard Specs shall be used as the bedding and cover material on all water main installations.

Backfill used on this contract for water main work shall be either mechanically compacted crushed concrete meeting the gradation requirements for granular material as specified in Table 37 in Section 8.43.4 of the Standard Specs, or aggregate slurry backfill as specified in Section 8.43.8 of the Standard Specs.

The backfill shall be consolidated by mechanical compaction of the trench as specified in Section 2.6.14(b) of the Standard Specs unless otherwise stated.

Lumps of clay, loam, spoils (unless otherwise stated), garbage, organic material, or any other material the Engineer deems unsuitable are not allowed in the backfill, and the Engineer reserves the right to order the Contractor to remove such items from the trench before paving commences, at the Contractor's expense, should the pieces be deemed unreasonably large and/or numerous. Material resulting from incidents such as, but not limited to, trench wall collapses is NOT excluded from this rule. For instances where the Contractor does not remove unacceptable backfill when directed, they shall be charged a percentage of the price for the pipe over the lineal footage in which the fill is present, to be deducted from monies owed to the Contractor.

### B. INSULATION AROUND WATER MAINS & APPURTENANCES

The Contractor shall provide and install extruded polystyrene rigid insulation with a minimum of 25 PSI compressive strength, two layers of 2 inch thick by 6 feet long by the width of the trench, between storm sewer and structure installations and all water mains and services at all locations shown on the plans, and at any other location where a water main or service is exposed, or as directed by the Engineer. Insulation shall also be placed under water mains and services where they cross over the storm sewer and have a separation of less than 12 inches. Include costs with the price of the storm sewer relay, repair, extension or structure, or water main relay, repair, or extension.

If the vertical separation is greater than 12 inches and the service or main has a minimum of 6 feet of cover, the insulation need not be installed unless shown on the plans. Unless otherwise noted by the Engineer, insulation shall be considered incidental to the work.

### C. CHLORINATION AND DISINFECTION

This section shall be incidental to the contract.

Disinfection of water mains shall be in accordance with Sections 4.3.12 and 4.16 of the Standard Specs. The Contractor shall take the necessary samples, under the supervision of the Engineer, and provide all costs for testing. Copies of the test reports shall be furnished to the Engineer and City Water Department. Calcium hypochlorite tablets shall be attached by a food-grade adhesive. Examples of food-grade adhesives are Permatex Form-A-Gasket No. 2 and Permatex Clear RTV Silicone Adhesive Sealant, which are manufactured by Loctite Corporation, Kansas City, KS 66115. These products have both been approved by USDA for uses that may contact edible products. **Other company products, such as Permatex Form-A-Gasket No. 1 are not allowable even though they are listed in the Standard Specs as being acceptable.**

Disinfection of all new, cleaned or repaired water mains shall be in conformance with the latest revisions of Chapter 4.16.0 of the Standard Specs, NR 811.07(3) and AWWA Standard C651.

#### D. FLUSHING

This section shall be incidental to the contract.

##### 1. REQUIREMENTS FOR FLUSHING

Prior to flushing ANY water from the newly installed water main or existing water main system, the contractor shall adhere to the following requirements:

- The Contractor shall apply for a General Wastewater Permit by submitting an eNOI or NOI along with any other additional information required to the Wisconsin Department of Natural Resources (WDNR) separately of the City of Wauwatosa WDPES Permit. Contractor shall follow all requirements set forth within the issued permit and the Contractor is solely liable for any violations of the requirements set forth within the permit by the WDNR. A copy of the permit shall be supplied to the City as record that the contractor has successfully received an approved permit from the WDNR. Contractor's shall plan to submit an eNOI or NOI form to the WDNR at least thirty (30) business days before the expected start date of discharge.

Submit the completed eNOI or NOI to Maya Welch, WDNR, by email at [maya.welch@wisconsin.gov](mailto:maya.welch@wisconsin.gov).

- If approved by the Engineer, the contractor may elect to discharge flush water into the sanitary sewer system without being required to apply for a WDPES Permit. Prior to discharging, the Contractor must submit a local sewer flush plan that includes the discharge location into the sanitary



sewer, the flow rate of the discharge, and the expected volume of the discharge. Discharge to the sanitary sewer shall not be permitted during a rain event or within 24 hours of a 1 inch or greater rainfall event within MMSDs service area. Discharge into the sanitary sewer system requires a minimum of 3 days notice to the Engineer & MMSD. The Contractor shall contact Micki Klappa-Sullivan at 414-225-2178 or [mklappasullivan@mmsd.com](mailto:mklappasullivan@mmsd.com) and provide the date(s) of the planned flushing event and an approximate of how much water will be discharged into the sanitary sewer system.

2. CLEARING THE MAIN OF HEAVILY CHLORINATED WATER

After the applicable retention period, heavily chlorinated water should not remain in prolonged contact with pipe. In order to prevent damage to the pipe lining or corrosion damage to the pipe itself, the heavily chlorinated water shall be flushed from the main until chlorine measurements show that the concentration in the water leaving the main is no higher than that generally prevailing in the distribution system and is acceptable for domestic use. Prior to final flushing and before connection to the existing main, the Contractor shall initially flush the new main using the temporary vents and filler pipes specified. The required velocity in a water main being flushed shall be 2.5 feet/sec. This equates to the following required flows:

<u>Water Main Diameter (in.)</u>	<u>Flow Required to Produce 2.5 fps</u>
6	200 GPM
8	400 GPM
10	600 GPM
12	900 GPM
16	1600 GPM

3. DISPOSAL OF HEAVILY CHLORINATED AND FLUSHING WATER

The Wisconsin Department of Natural Resources prohibits discharges of chlorinated and/or contaminated water into any surface waters of the State whether directly or indirectly through storm sewers. To be in compliance with these regulations, the Contractor shall apply for a General Wastewater Permit and follow all requirements of the permit unless discharging into the sanitary sewer system following the notices above to MMSD. Appendix B of AWWA Standard 651 contains a list of neutralizing agents and their required dosages.

In addition to the above, the Contractor shall take grab samples a minimum of 2 times per day during flushing. They shall be taken after the neutralizing chemical has been introduced to the flushing water and at the onset of the initial flushing. The Contractor, at their expense, shall have these grab samples analyzed for

the following:

- Total Suspended Solids (mg/L)
- pH (s.u.)
- Oil & Grease (mg/L)
- Dissolve Oxygen (mg/L)
- Total Residual Chlorine (mg/L)
- Any additional sampling requirements as required by permits issued by the WDNR.

Copies of all reports associated with the sampling requirements shall be submitted to the City and also to the WDNR as required by the issued permit.

#### E. BACTERIOLOGICAL TESTS (SAFE SAMPLE)

Incidental to the contract, after final flushing, before the water services are connected, and before the new main is placed into service, a minimum of 2 consecutive sets of acceptable safe samples, taken at least 24 hours apart, shall be obtained. At least one set of samples shall be collected from every 1200 feet of new water main. All safe samples shall show the absence of coliform organisms. Sample reports shall be delivered to the Engineer and City Water Department and approved before "wet" connections may begin. No "wet" connection greater than 20 feet shall be allowed without the written approval of the Engineer in order to reduce the risk of contamination.

#### F. DISINFECTION PROCEDURES WHEN CUTTING INTO OR REPAIRING EXISTING MAINS

This section shall be incidental to the contract.

The following procedures apply when existing mains are wholly or partially dewatered. After the appropriate procedures have been completed, the existing main may be returned to service prior to completion of bacteriological testing in order to minimize the time customers are out of water. Leaks or breaks that are repaired with clamping devices while the mains remain full of pressurized water present little danger of contamination and require no disinfection.

##### 1. TRENCH TREATMENT

When an existing main is opened, either by accident or by design, the excavation may contain standing water which may be contaminated from nearby sewers.

Liberal quantities of hypochlorite applied to open trench areas will lessen the danger from such pollution. Tablets have the advantage in such a situation because they dissolve slowly and continue to release hypochlorite as water is pumped from the excavation.

## 2. SWABBING WITH HYPOCHLORITE SOLUTION

The interior of all pipe and fittings (particularly couplings and sleeves) used in making the repair shall be swabbed or sprayed with a 1% hypochlorite solution before they are installed.

## 3. FLUSHING

Thorough flushing is the most practical means of removing possible contamination introduced during repairs. If valve and hydrant locations permit, flush toward the work location from both directions. Flushing shall be started as soon as the repairs are completed and shall be continued until discolored water is eliminated. Flushing shall follow the requirements for flushing stated in Section 610.2.02.D.1.

## G. SPECIAL PROCEDURES FOR TAPPING SLEEVE VALVES

This section shall be incidental to the contract.

Before a tapping sleeve is installed, the exterior of the main to be tapped shall be thoroughly cleaned, and the interior surface of the sleeve shall be lightly dusted with calcium hypochlorite powder.

Tapping sleeves are used to avoid shutting down the main to be tapped. After the tap is made, it is impossible to disinfect the annulus without shutting down the main and removing the sleeve. The space between the tapping sleeve and the tapped pipe is normally ½ in., more or less, so that as little as 100 mg/ft<sup>2</sup> of calcium hypochlorite powder will provide a chlorine concentration of over 50 mg/L.

## 610.2.03 - WATER MAIN MATERIALS

### A. WATER MAIN PIPE

#### 1. DUCTILE IRON

The type of water main pipe to be used on this contract shall be as noted on the plans. Ductile Iron Pipe shall conform to AWWA C-151 Special Class 55 and of the size shown on the plans. The pipe shall have bell and spigot ends designed for a Tyton rubber gasket push-on-joint. All ductile iron pipe and fittings shall be coated as specified in Chapter 8.18.3 of the Standard Specs. All metal pipe, fittings and materials shall be encased in a **double** layer of polyethylene wrap as specified in Chapter 8.21.0 of the Standard Specs, **before bedding and backfilling.**

## 2. PVC/HDPE/NONMETALLIC

The type of water main pipe to be used on this contract shall be as noted on the plans. The size of the pipe shall be as shown on the plans. PVC Pipe shall be C-900 DR18 or less in conformance with AWWA C-900, ASTM D-3139, and ASTM F-477 for sizes 4" through 60". The pipe shall have integral elastomer bell and spigot ends designed for a rubber gasket push-on-joint. CertaLok® PVC water main pipe shall conform to AWWA C-900 DR18 and installation shall be completed under AWWA C-605. High-Density Polyethylene (HDPE) pipe for directional drilling projects shall be DR11, ductile iron pipe size (DIPS), and pressure class 200 conforming to AWWA C-906. Ductile iron fittings coated as specified in Chapter 8.18.3 of the Standard Specs shall be used with Megalug retainer glands specifically rated for use with selected nonmetallic pipe. All metallic fittings, stand pipes, and other appurtenances used with nonmetallic water main shall be covered in a **double**, watertight layer of polyethylene wrap, as specified in Chapter 8.21.0 of the Standard Specs, before bedding and backfilling.

### a. TRACER WIRE

In open cut/trench construction, all nonmetallic water mains, leads and services shall be installed with a minimum #12 AWG copper clad steel, blue coated, 30 mil minimum HDPE insulated, high strength (minimum 450 lb. break load) tracer wire intended for direct bury, in accordance with Chapter 2.11.2 of the Standard Specs, APWA standards, and the City Specs, as incidental to the cost of the pipe.

For trenchless installation, all nonmetallic water mains, leads, and services shall be installed with tracer wire as noted above, except it shall be aircraft cable, nylon coated, stainless steel, and 3/8" diameter.

Except where the Engineer has given written approval for spliced-in connections, tracer wire systems shall be as continuous as practicable. Connections of tracer wire shall be in a low voltage, lockable, waterproof, underground, dielectric silicone filled connector, and shall be installed in such a manner as to prevent any exposure of uninsulated wire. Copperhead SnakeBite direct bury lug connector 3WB-01 or Engineer approved equal shall be included in the material submittals. No friction fit, twist-on, or taped connectors are allowed. No looping, wrapping, or coiling of tracer wire is allowed. The wire shall be placed along the entire length of the pipe and taped on the top of the pipe at minimum 10 foot intervals. No spray coatings or taped coatings for the wire are allowed. No connections to conductive pipes, fittings, glands, stand pipes, sleeves, or any other non-tracer wire material are allowed – the entire conductive tracer system shall only be constructed of tracer wire and tracer wire connectors as described above.

At the point of connection between metallic water main and any non-metallic water main, the mainline tracer wire shall go to ground using a connection

approved in writing by the Engineer to a Copperhead drive-in magnesium grounding anode rod, part # ANO-12, or equal as approved in writing by the Engineer, with 20 feet of #12 AWG copper clad steel wire. Installation of the grounding anode rod shall be directly beneath and in-line with the water main. Excess wire from the grounding anode shall be trimmed to an appropriate length and not coiled.

All mainline dead-ends for non-metallic water mains shall go to ground using the same method described above.

i. TESTING

All new tracer wire installations shall pass testing by locating them using typical 512Hz low frequency line tracing equipment, witnessed by the Contractor and the Engineer before full payment for all piping will be made. Continuity testing in lieu of actual line tracing shall not be accepted.

ii. TERMINATION/ACCESS

Wire shall be brought to the surface at all hydrants and curb stops, unless otherwise directed by the Engineer. At hydrants, wire shall be brought to the surface inside a 2" PVC Schedule 40 vertical sleeve (minimum 3' bury depth) that is opposite the pumper nozzle on the back of the hydrant, with at least 24" of excess wire to allow for future locating and maintenance. A Tracer Wire access box by Bingham & Taylor, Inc. #P2B200NFG, Copperhead SnakePit #LD14BTP, or approved equal must be visible and accessible and be set to no more than 3" above finish grade.

For curb stops, the wire shall be run directly on the outside of the stand pipe all the way to the surface, and a MINIMUM 6" excess "pigtail" coiled below the cap of the stand pipe. Wire shall NOT be terminated in mainline, branch service, or hydrant valve boxes unless otherwise directed in writing by the Engineer.

For mains without services or hydrants, access locations shall use tracer wire access boxes as approved in writing by the Engineer.

b. RESTRAINED BELL-SPIGOT JOINTS

All PVC bell restraints shall be of a RODDED variety approved in writing by the Engineer. NO push-on gasket restraints shall be allowed without an

accompanying gland-to-gland fitting spanning the bell.

## B. HYDRANT LEAD

All hydrant leads shall be as specified on the plans. Nonmetallic leads shall, at a minimum, conform to AWWA C-900 DR14. Ductile iron hydrant leads shall be encased in polyethylene wrap. All types of leads shall be buttressed at the tee and hydrant ends with concrete and/or hardwood blocks and all joints shall be restrained. The hydrant itself shall be set on concrete or brick blocks. This work shall be incidental to the cost of the hydrant or lead.

## C. FITTINGS

All fittings shall be cement lined, ductile iron compact fittings furnished with mechanical joints conforming to ANSI/AWWA C153 and C111, in accordance with section 8.22.0 of the Standard Specs and coated in accordance with section 8.18.3 of the Standard Specs. All fittings shall be 350 psi rated water working pressure. Megalug retainer glands shall be used on all fittings. Glands shall be specifically rated for the main and lead material which is being used. All fittings shall be set and buttressed with concrete and/or hardwood blocks. Where sleeves are required, the Contractor shall use solid iron sleeves, dual purpose sleeves, Romac Alpha couplings or Hymax Grip couplings or Engineer approved equal for both metallic and non-metallic mains.

Where shown on the plans or as approved in writing by the Engineer, restraint strapping shall follow section 4.9.0 of the Standard Specs with number and size of retaining rods recommended by pipe restraint manufacturer for the type and size of pipe used. Metallic water main bell-spigot joints may only use restraining glands in lieu of rodded bell restraints when approved in writing by the Engineer.

All fittings and connections to appurtenances shall use coated, corrosion resistant nuts and bolts (Cor-Blue), which will be incidental to the cost of the fittings. All fittings shall be coated in polyethylene wrap per Chapter 8.21.0 of the Standard Specs.

## D. VALVES

All gate valves shall be mechanical joint resilient wedge valves manufactured to meet all applicable requirements of Section 8.27 of the STANDARD SPECS and AWWA C509 or C515. All gate valves shall be 200 psi rated water working pressure. Gate valves are required for valves 12" and smaller.

Acceptable resilient seat gate valve manufacturers are:

- American Flow Control Series 2500
- Clow Models Series 2639
- Kennedy Models KS-FW or KS-RW 8571

- Mueller Series 2360
- Or equal as approved in writing by the Engineer

All butterfly valves shall be mechanical joint rubber-seated valves manufactured to meet all applicable requirements of Section 8.28 of the Standard Specs and AWWA C504. All butterfly valves shall be 150 psi rated water working pressure and the operating nut shall be oriented towards the centerline of the road.

Acceptable butterfly valve manufacturers are:

- Clow Style 4500
- M & H Style 4500
- Mueller Linseal III Series
- Or equal as approved in writing by the Engineer

Each valve shall be tested by hydrostatic pressure equal to twice the specified working pressure. All valves shall have mechanical joints with Cor-Blue bolts and nuts made of coated corrosion resistant steel. All exposed valve hardware shall be T304 stainless steel. **All valves shall have a non-rising stem and shall open to the right (clockwise).**

Valves for hydrants shall be attached directly to the mechanical joint anchoring tee except where shown otherwise on the plans.

All valves shall be furnished with 6860 series roadway box and cover as manufactured by Tyler Union, Inc. or Engineer approved equal, and shall be in accordance with section 8.29 of the Standard Specs. The valve box shall be a ductile iron, three-piece screw type unit with a 5- $\frac{1}{4}$ " shaft and 17- $\frac{1}{4}$ " diameter (#6) base, and set to the correct grade for the finished restoration (1/2 inch below grade in turf). The cover shall be marked "WATER".

Gate valves shall also be furnished with a "6 Base Multifit Adaptor" or "Gate Valve Adapter" as manufactured by Adaptor Inc. or Engineer approved equal. Butterfly valves shall be furnished with a "Butterfly Valve Adaptor" as manufactured by Adaptor Inc. or Engineer approved equal.

Glands, nuts and bolts, valve adaptors, stand pipe bases, stand pipes, blocking, and covers, shall be incidental to the valve work.

## E. FIRE HYDRANTS

### 1. GENERAL

All fire hydrants shall fully comply with AWWA STANDARD C-502 latest revisions. Bury depths shall be as shown on the plans, or as needed to suit the site conditions (with approval of the Engineer), or 6'-6" minimum. Pumper nozzle elevation shall be 18"-24" above finished grade (soil grade in turf areas, not vegetation grade). The center of the hydrant shall be 4' behind the back of curb

unless otherwise noted on the plans or directed by the Engineer.

The hydrants shall be designed for 250 psi working pressure and tested to 500 psi hydrostatic pressure test.

The Contractor shall warrant that the fire hydrant and component parts are first quality, conform to the applicable specifications, are free from material defects, faulty construction and poor workmanship, and are suitable for normal usage in a water distribution system. The warranty shall be for 100% of parts and labor. The period of warranty coverage shall be that normally provided by the manufacturer, but not less than 5 years from the date of the hydrant installation. The Contractor agrees to repair or replace within a reasonable time period any hydrant or accessory found to be defective during the warranty period at no cost to the City.

**The Contractor shall check the operation of each hydrant and flow test all new hydrants after installation and interconnections are made. In addition, the Contractor shall fully open all new hydrants with all three caps tightened to check for leaks (i.e., pressure test), then fully close the hydrant and loosen all caps.**

The Contractor shall make any necessary repairs or replace defective hydrants, and shall conduct the flow testing so as to disturb the surrounding area as little as possible. The Contractor must check the grade in the area to ensure that no soft spots in the grade have been created. Soft areas shall be stabilized or replaced immediately. **All testing shall be performed in the presence of and approved by the Engineer.**

## 2. TRAFFIC MODEL

The hydrants shall be of the traffic model design consisting of a breakaway safety flange and a safety sleeve coupling. The design shall permit a 360° rotation of the upper nozzle section, or any increment thereof, in any direction. The nozzle placement shall not be restricted by bolt hole placement.

## 3. EXTENSIONS

Hydrants shall be designed so that an extension may be added to installed hydrants. All extensions shall be made for insertion below the breakaway flange, and shall be available in increments of 6 inches, beginning with 6 inch length.

## 4. NOZZLE ARRANGEMENT

All hydrants shall have two 2-½ inch hose nozzles and one 4-½ inch pumper nozzle with National Standard threads, with all at the same elevation and the center of the pumper nozzle at least 18 inches from the bury line.

## 5. NOZZLES



Outlet nozzles shall be made of bronze and be fastened into the nozzle section by mechanical means or caulking. All outlet nozzles shall be safeguarded against blowing out. For screwed-in outlet nozzles, a pin or other method shall be used to prevent the outlet nozzle from turning or backing out. Screwed-in outlet nozzles shall use "O" rings for pressure seals. Nozzle threads shall be National Standard.

## 6. INLET CONNECTION

The hydrant shall be furnished with a 6-inch D-150 mechanical joint shoe of the enlarging type designed to accommodate the pipe material shown on the plans.

Shoe bolts and nuts shall be corrosive resistant or 300 Series 18-8 stainless steel or coated, corrosion resistant bolts. The inlet connection shall be 6 inch mechanical joint complete with accessories including gland, gaskets, and corrosion resistant nuts and bolts.

## 7. HYDRANT VALVE

Hydrants shall have a minimum valve opening of 5-¼ inch diameter. The hydrant valve shall be reversible and designed to close with hydrostatic line pressure. The valve shall be faced with a suitable yielding material. The hydrant valve assembly shall be made of bronze and shall thread into a bronze bushing or drain ring. The valve assembly shall include a drain valve to drain the hydrant automatically each time it is operated. The drain way and cross arm must be constructed of bronze. Lower threads of the operating rod shall be protected by a cap-nut. The main valve and seat ring shall be removable through the upper barrel from above ground without disassembling the ground line flanges. The interface between the ferrous and non-ferrous surfaces shall be coated with anti-seize material. The hydrant shall be equipped with a positive operating drain valve to drain the hydrant when the main valve is closed. The drain valve shall be designed to close when the main valve is opened.

All hydrants shall be of compression type main valve closing with water line pressure.

## 8. DIRECTION OF OPERATION

Hydrants shall turn counterclockwise (left) to open.

## 9. OPERATING NUT AND NOZZLE CAP NUTS

All hydrants shall have all bronze 1-½ inch point to flat pentagon shaped operating nut, turn left to open, and shall have 1-½ inch pentagon shape nozzle caps and pumper caps. All operating nuts shall be provided with an internal metal weather shield to protect the operating nut from freezing.

## 10. LUBRICATION

Hydrants shall be of dry top design with its own lubricating system located in the bonnet which lubricates the upper stem threads each time the hydrant is operated. Lubricant shall be nontoxic and provide proper lubrication for a temperature range of -30° F to +120° F.

#### 11. BONNET

All threaded and metal to metal bearing surfaces in the bonnet shall be sealed away from the line pressure by no less than two "O" rings. The upper stem shall be provided with a stop.

#### 12. COLOR

The top section of the hydrant shall be primed and painted with a rust inhibitive industrial urethane enamel such as Pennsbury Setter Red No. 9050 or Rustoleum Fire Hydrant Red applied over a base of #1069 Rustoleum Primer, or an approved equal. All exterior parts of the hydrant top section shall be painted as described above.

#### 13. CORROSION RESISTANT NUTS AND BOLTS FOR GLANDS

Cor-Blue corrosion resistant, coated bolts and nuts are required at all locations which will be below ground level under normal conditions. With approval of the Engineer, 300 Series 18-8 stainless steel nuts and bolts may be used. Above ground portions shall have the appropriate grade of stainless steel fastener.

#### 14. ACCEPTABLE HYDRANTS

All hydrants supplied shall be new and unused. Factory rebuilt hydrants are not acceptable. Acceptable hydrants for City of Wauwatosa are as follows:

- Mueller Super Centurion 250™, A423
- AFC Fire Hydrant 5 ¼" Waterous Pacer WB-67 with 16" Breakoff Section

### F. WATER SERVICE ALTERATION, RELAY AND RECONNECTION

The reconnection to the existing water main for the corporation stop of the tap service shall be made by the Contractor. Materials and construction shall conform to File No. 52 of the Standard Specs for connecting and replacing original services or File No. 51 for new services with the exception that an approved tapping sleeve shall be used. Reduced Port corporation stops and curb stops shall be **"ball valve type"** with 300 psi rated working pressure. Curb stop boxes shall be Minneapolis Style.

#### 1. SERVICES TO METALLIC AND NON-METALLIC MAINS

Unless otherwise noted on the plans, services shall be High Density Polyethylene

(HDPE) SDR 9, copper tube size (CTS) conforming to AWWA C-901. The size for Replace Original Service (ROS) shall be a minimum of 1-1/4 inch, and for a Connect Original Service (COS) a minimum of 1 inch or sized to match existing, if larger, or as shown on the plans. The COS shall also match existing material. The tap and tapping saddle/sleeve shall be 1 inch. The corporation stops shall be 1 inch by 1-1/4 inch. Sizes of taps, saddles, corporation stops, and curb stops shall match the size of the existing for services larger than 1-1/4 inch. All fittings shall be specifically rated for the appropriate water main material and/or polyethylene services (as applicable), and use Engineer approved compression fittings with stainless steel stiffeners for the services. The Contractor shall provide frost protection as shown on the plans, or in locations as described in section 610.2.02 B of these City Specs as incidental to the work.

## 2. WATER SERVICE FITTINGS

Corporation Stops shall be a reduced port ball valve with AWWA/CC taper thread inlet by compression quick joint coupling outlet for CTS. Curb Stops shall be a reduced port ball valve compression quick joint coupling for CTS on either ends. Corporation Stops, Curb Stops and couplings for nonmetallic services require tubular stainless steel insert stiffeners.

Acceptable corporation stop manufacturers are:

- Ford Quick Joint Model FB1000-45-Q-NL
- AY McDonald Model 74701BQ
- Equal as approved in writing by the Engineer

Acceptable curb stop manufacturers are:

- Ford Quick Joint Model B44-455M-Q-NL
- AY McDonald Model 76104Q
- Equal as approved in writing by the Engineer

Acceptable stainless steel CTS insert stiffener manufacturers for use with 1-1/4 inch HDPE SDR 9 tubing are as follows:

- Ford INSERT-53-72
- AY McDonald 6133T
- Equal as approved in writing by the Engineer

Acceptable service line compression quick joint connector 1-1/4 inch to 1-1/4 inch fitting manufacturers are:

- Ford Model C44-55-Q-NL
- AY McDonald 74758Q
- Equal as approved in writing by the Engineer

Acceptable 1-1/4 inch HDPE SDR9 or copper tubing to lead fitting combination

manufacturers are:

- Ford Model Q22-44 Coupling & C04-45 Adapter
- AY McDonald Model 74758C-67 Coupling & 74755Q Adapter
- Equal as approved in writing by the Engineer

Acceptable 3-inch curb stop box manufacturers are:

- Ford Model EM2-65-56
- AY McDonald 5614A
- Equal as approved in writing by the Engineer

Where designated on the plans or ordered by the Engineer, the Contractor shall install the new or replacement tap water service piping by an approved trenchless method, such as drilling, boring, jacking, auger boring, or fluid boring. The trenchless method used shall be capable of installing the water service piping horizontally and level with the water main to within a 12 inch radius of the target at the proposed location of the new curb stop.

The Contractor shall exercise care in locating and excavating, shoring and bracing the starting and recovery pits to assure underground and aboveground structures and trees are not damaged by their operations. Where a trenchless method of installation is required because of the necessity to protect a tree or as directed on the plans, the Contractor shall not drive heavy equipment or store materials within a radius of 5 feet from tree trunks unless the area is paved or protected from soil compaction by the use of planks or similar materials. To minimize damage to the tree's root zone during the installation of the water service piping no excavation shall be made within the following limits:

<u>Tree Diameter (In.) (@ 4.5' Above Ground)</u>	<u>No Excavation Limits Distance (ft.) from Trunk</u>
0 - 2	1
3 - 4	2
5 - 9	5
10 - 14	10
15 - 19	12
Over 19	15

The Contractor may encroach on the above limits if the water main to which the water service piping will be connected or the house side of the existing City sidewalk is within the specified no excavation zone. The Contractor shall keep these excavations as small as possible and shall contact the Engineer at least 3 days prior to starting the installation so they may notify the City Forester.

The City has obtained or is in the process of obtaining right-of-entry permits from affected property owners in order for the Contractor to complete their work on private property. All trees, bushes, shrubs, lawn, walk, driveway, etc. on

private property damaged by the Contractor shall be repaired or replaced by the Contractor at no cost to the private property owner, and to the satisfaction of the Engineer. Costs for this work should be included in the bid price for the water service piping. No additional compensation will be made.

Where trenchless methods are required, payment will be per foot from the centerline of the main to the point of reconnection to the existing service behind the walk as measured horizontally and perpendicular to the street without regard to the amount of piping that may be installed in an open cut trench. Where no method is specified or open cut is specified, the Contractor may select any approved method of installation, however, the payment will be at the open cut per foot bid price.

Existing curb stops shall be abandoned by the Contractor by removing only the top section of the service box and backfilling the remaining hole with suitable material. The cost of this abandonment shall be included in the price for an ROS or COS. Existing services which are replaced shall be disconnected as detailed in the Standard Specs.

#### G. SERVICE SADDLE

All water service (re)connections 2" and smaller, as well as air vents, for metallic and nonmetallic pipe shall be wet tapped under pressure using a one piece, double bolt, stainless steel service saddle clamp conforming to Smith-Blair 372, with AWWA/CC taper thread or *equal as approved in writing by the Engineer*. Service saddles shall be furnished by the Contractor as incidental to the service.

Services larger than 2" that are installed under pressure require an Engineer approved 2 piece stainless steel, heavy duty tapping sleeve with slip through bolts and a resilient wedge gate valve. Approved stainless steel tapping sleeves include: Smith-Blair 665 or Romac SST III, both with flanged outlet.

The Contractor shall refer to the manufacturer's instructions for the installation of a specific sleeve.

#### H. WATER VALVE BOX ADJUSTMENTS

The item for adjusting roadway boxes and curb stop boxes for water valves requires the Contractor to furnish all labor, equipment, and materials necessary to clean, adjust, and repair all boxes for mainline or hydrant gate valves, air vents and curb stop valves lying within the construction limits. This work requires the boxes to be placed at grade and operational (with stable covers) regardless of the amount of cleaning, adjustment, repair, or amount of material required. If no bid item is listed, this work shall be incidental to the contract.

Raising rings, commonly used for resurfacing work, will be reviewed and possibly accepted as an adjustment on a case-by-case basis (existing threaded rings, which are intact, may remain without review) by the Engineer. Also included in this item is any necessary plumbing work in raising or lowering an air vent.

Water curb stop boxes centered less than a foot and a half from the curb face are indicated for adjustment by the Contractor under the item provided. The Contractor shall be held responsible for damage to all water valve boxes.

#### 610.2.04 - HYDROSTATIC TESTS

The Contractor shall provide for the testing of all new mains under the supervision of the Engineer before any “wet” connections are made or new services are relayed or reconnected, in accordance with Chapter 4.15.0 of the Standard Specs and the following requirements:

- A. The duration of the hydrostatic pressure test shall be 150 psi for at least **2 hours** in conformance with AWWA 600-93 Section 4.1.1. This is an increase from the 1 hour specified in Chapter 4.15.0 of the Standard Specs.
- B. Separate tests on the entire length of new mains between each proposed cut-in connection shall be required. After the service reconnections are made the Contractor will not be allowed to shut down the new proposed main for any reason.
- C. Upon completion of all interconnections or offset installations, the section of new main shall be subject to line pressure prior to backfilling. Any visible defects observed in the connecting main shall immediately be repaired by the Contractor at their expense prior to backfilling.
- D. Cost of all testing and sampling shall be at the Contractor's expense.
- E. After completion of all reconnects and interconnections are completed, the old main shall be abandoned by capping or bulk heading with brick and mortar, a metallic cap with gland appropriate for the main material, or as approved in writing by the Engineer as incidental to the contract.

## **SECTION 613**

### **SEWER LINE CLEANING**

#### **A. INTENT**

The intent of sewer line cleaning is to remove foreign materials from sewer lines and restore the sewer to a minimum of 95% of the original carrying capacity and as required for proper inspection of the pipe and joints. Since the success of the other phases of the work depends a great deal on the cleanliness of the lines, the importance of this phase of the operation is emphasized. The City recognizes there are some conditions such as broken pipes and major blockages that prevent cleaning from being accomplished, or where additional damage would result if cleaning was attempted or continued. Should the contractor encounter such conditions, they will not be required to clean those specific sections without the express written permission of the Engineer. If in the course of normal cleaning operations damage does result from preexisting and unforeseen conditions such as broken pipe, the Contractor will not be held responsible.

**The contractor shall also submit a written report of the sewer cleaning. This report shall identify the sewer segments cleaned and the type and volume of debris removed from the sewers. All reports shall be made by NASSCO certified technicians.**

**Neither the sewers being inspected on this contract nor the sanitary sewers tributary to them have a history of industrial waste disposal. PCB's should not be encountered and, therefore, no testing of the sediments or solids will be required.**

All cleaning work shall be in conformance with specification guidelines from the National Association of Sewer Service Companies (NASSCO) dated November 2014.

#### **B. CLEANING EQUIPMENT**

1. **Hydraulically Propelled Equipment:** The equipment used shall be of a movable dam type and be constructed in such a way that a portion of the dam may be collapsed at any time during the cleaning operation to protect against flooding of the sewer. The movable dam shall be equal in diameter to the pipe being cleaned and shall provide a flexible scraper around the outer periphery to ensure removal of grease. If sewer cleaning balls or other equipment that cannot be collapsed are used, special precautions to prevent flooding of the sewers and public or private property shall be taken at the Contractor's expense.

2. High-Velocity Jet (Hydrocleaning) Equipment: All high-velocity sewer cleaning equipment shall be constructed for ease and safety of operation. The equipment shall have a selection of two or more high-velocity nozzles. The nozzles shall be capable of producing a scouring action from 15 to 45 degrees in all sizes of lines designated to be cleaned. Equipment shall also include a high-velocity gun for washing and scouring manhole walls and floor. The gun shall be capable of producing flows from a fine spray to a solid stream. The equipment shall carry its own water tank, auxiliary engines, pumps, and hydraulically driven hose reel.
3. Mechanically Powered Equipment: Bucket machines shall be in pairs with sufficient power to perform the work efficiently. Machines shall be belt operated or have an overload device. Machines with direct drive that could cause damage to the pipe will not be allowed. A power rodding machine shall be either a sectional or continuous rod type capable of holding a minimum of 750 feet of rod. The rod shall be specifically heat-treated steel. To ensure safe operation, the machines shall be fully enclosed and have an automatic safety clutch or relief valve.

#### C. USE OF CITY WATER

Water is only available from select hydrants as the City's Water Department may designate. Water may not be available from City hydrants during cold weather months. The contractor shall secure permission from the Water Department, obtain all necessary permits, and notify the Engineer and Fire Department before obtaining water from fire hydrants. The Contractor shall make his own arrangements and pay all costs for water, connecting to hydrants, and transporting the water to the construction work. Upon payment of the fees, the City will furnish one hydrant meter setting with vacuum breaker, backwater valve and control valve. The City of Wauwatosa water department will set the meter, but the Contractor shall be responsible for the meter setting and valves at each location water is drawn. If the meter setting needs to be moved, the Contractor shall contact the water department at least 24 hours in advance to have them move it. By using the meter setting, cross connections to and contamination of the City's water supply is minimized. The water department will bill the contractor based on the actual metered amount of water used.

Hoses from hydrants shall not extend across roadways, which are open to traffic, unless they are properly protected from any wheel loads. Water main breaks caused by pressure surges introduced into the system from wheel loads or improper use of hydrants shall be repaired at the expense of the Contractor.

Use only special hydrant-operating wrenches to open hydrants. Hydrant valves must be opened "full", since "cracking" the valve causes damage to the hydrant. If any hydrants are damaged, the Contractor will be held responsible and shall notify the appropriate agency and the Engineer and the Water Department



Superintendent so that all damage can be repaired as quickly as possible. Fire hydrants shall be completely accessible to the Fire Department at all times. Upon completion of the work, the Contractor shall remove all temporary piping and facilities.

D. CLEANING PRECAUTIONS

During sewer cleaning operations, the contractor shall take satisfactory precautions in the use of cleaning equipment. When hydraulically propelled cleaning tools (which depend upon water pressure to provide their cleaning force) or tools which retard the flow in the sewer line are used, the contractor shall take precautions to insure that the water pressure created does not damage or cause flooding of public or private property being served by the sewer. When possible, the contractor shall utilize the flow of sewage in the sewer to provide the necessary pressure for hydraulic cleaning devices. When additional water from fire hydrants is necessary to avoid delay in normal work procedures, the contractor shall conserve water and not use it unnecessarily. No fire hydrant shall be obstructed in case of a fire in the area served by the hydrant.

E. SEWER CLEANING

The Contractor shall light clean all sewers using hydraulically propelled, high-velocity jet, or mechanically powered equipment. Selection of the equipment used shall be made by the Contractor and based on the conditions of lines at the time the work commences. The equipment and methods selected shall be satisfactory to the Engineer. The equipment shall be capable of removing dirt, grease, rocks, sand, and other materials and obstructions from the sewer lines and manholes.

If cleaning of an entire section requires a significant portion of the cross-sectional area of the pipe to be cleaned, the contractor shall use appropriate methods to successfully complete the job. This is determined by NASSCO standards as follows:

Up to 12" diameter	25% of the cross-sectional area blocked
13-24" diameter	15% of the cross-sectional area blocked
Above 24" diameter	10% of the cross-sectional area blocked

When this becomes necessary, the City will pay the Contractor under the bid item for heavy cleaning.

If cleaning of an entire section cannot be successfully performed from one manhole, the equipment shall be set up on the other manhole and cleaning again attempted. If, again, successful cleaning cannot be performed or the equipment fails to traverse the entire manhole section, it will be assumed that a major blockage exists and the cleaning effort shall be abandoned with the express written permission of the Engineer.

The Contractor shall conduct a post-cleaning CCTV inspection such that the Engineer can verify cleaning has been successfully accomplished. If the segment is scheduled to be televised as part of this contract, this inspection may serve as fulfillment of the CCTV requirement for this segment. The televising shall be performed under specifications outlined in Section 614 of the Contract Documents and under NASSCO's specifications.

F. ROOTS, DEPOSITS, AND GREASEREMOVAL

The contractor shall remove roots, deposits, and grease in sections where t intrusion or accumulation is greater than 5% of the cross sectional area, but no greater than 50% of the cross sectional area. Since the locations of removal are unspecified, the contractor shall use their judgment to determine whether or not removal is necessary, the contractor shall also inform the Engineer prior to beginning any root cutting or debris or grease removal. The contractor shall use special attention during the cleaning operation to ensure a minimum 95%complete removal of roots or accumulations from the joints. Typical procedures may include, but not be limited to, the use of mechanical equipment such as rodding machines, bucket machines and winches using root cutters and porcupines, and equipment such as high-velocity jet cleaners equipped with root cutters or root rippers, and shall be incidental to the root removal bid item(s). The Contractor may NOT use chemical root treatments or chemical removers without the express written permission of the Engineer. The contractor shall document all locations in the pipe segment where roots, deposits, or grease were removed and the respective procedures used.

Any specific areas with roots, deposits, or grease accumulation greater than 50% of the cross sectional area shall have removal work paid under the heavy cleaning bid item.

G. MATERIAL REMOVAL

The contractor shall remove all sludge, dirt, sand, rocks, grease, and other solid or semisolid material resulting from the cleaning operation at the downstream manhole of the section being cleaned. Passing material from manhole section to manhole section, which could cause line stoppages, accumulations of sand in wet wells, or damage pumping equipment, shall not be permitted. The contractor shall use a vacuum truck to remove heavy accumulations of material at their own expense.

H. DISPOSAL OF MATERIALS

All solids or semisolids resulting from the cleaning operations shall be removed from the site and disposed of at a site chosen by the contractor and at the contractor's expense. All materials shall be removed from the site no less often that at the end of each workday. Under NO circumstances will the Contractor be

allowed to accumulate debris or other materials, waste or otherwise, on the site of work beyond the stated time, except in totally enclosed containers and as approved in writing by the Engineer.

I. BYPASSING SEWAGE

Inspections shall be scheduled during low flows where necessary to provide quality inspections. Where the flow in the sewer is such that the camera is more than 25% under water, the Contractor shall either restrict the flow in the sewer or use a jet to draw the sewage down in front of the camera as incidental to the cost of performing the work. Where flow conditions are such that satisfactory televising cannot be performed and restricting the flow will cause backup problems, the Contractor shall provide for the flow of sewage around the section or sections of pipe to be inspected. The bypass shall be made by plugging the line at an existing upstream manhole and pumping the flow into a downstream manhole or adjacent system. The pump and bypass lines shall be of adequate capacity and size to handle the flow. The contractor shall furnish the Engineer a detailed bypass plan for approval before commencing bypass operations.

J. FINAL ACCEPTANCE

Acceptance of sewer line cleaning shall be made upon the successful completion of the post-cleaning television inspection and shall be to the satisfaction of the Engineer. If the post-cleaning television inspection shows the cleaning to be unsatisfactory, the Contractor shall be required to re-clean and re-inspect the sewer line until the cleaning is shown to be satisfactory to the Engineer.

## **SECTION 614**

### TELEVISION INSPECTION SPECIFICATIONS

#### A. TELEVISION EQUIPMENT

1. All designated sewer sections shall be visually inspected by means of closed-circuit color television.
2. Television equipment shall include television camera, television monitor, cables, power source, lights, and other equipment. The television camera shall be specifically designed and constructed for operation in connection with sewer inspection. **The Camera shall be capable of a radial view (panning, tilting and rotating to be able to view the entire circumference of the pipe) for inspection of the top, bottom, and sides of pipe and for looking up lateral connections.** The view seen by the televising camera shall be transmitted to a monitor of not less than 17 inches. The camera, television monitor, and other components of the video system shall be capable of producing a picture quality satisfactory to the Engineer; and if unsatisfactory, the equipment shall be removed and no payment will be made for an unsatisfactory inspection.
3. The camera, television monitor, and other components of the video system shall be capable of producing a minimum 650-line resolution color video picture. The camera shall be mounted on skids suitably sized for each pipe diameter to be investigated or on a self-propelled transporter specifically sized for each pipe diameter to keep it in the center of the pipe.
4. The camera shall be operative in 100 percent humidity conditions and tested at 400 psi. Lighting for the camera shall minimize reflective glare. The lighting shall be supplied by a lamp on the camera, capable of being dimmed or brightened remotely from the control panel. Lighting and camera quality shall be suitable to provide a clear, in-focus picture of the entire inside periphery of the sewer pipe for all conditions encountered during the work. Focal distance shall be adjustable through a range of from 6 inches to infinity.
5. The location meter, for accurately recording the location of the television camera with respect to the reference manhole, shall be a direct reading, above ground, friction clamp device or other suitable equipment. Marking on the cable, or the like, which would require interpolation for depth of manhole, will not be allowed. The meter shall be capable of reducing readings for reverse movement of the camera and shall be capable of being manually re-zeroed for each new segment (MH-to-MH or MH-to-Inlet).
6. The importance of accurate distance measurements is emphasized. The remote reading footage counter shall be accurate to one percent over the length of the particular section being inspected. Accuracy of the measurement meter shall be

checked daily by use of a walking meter, roll-a-tape, or other suitable device. Footage measurements shall begin at the centerline of the upstream manhole and end at the centerline of the downstream manhole. Footage shall be shown on the video data view and recorded at all times.

## B. SEWER MAINLINE TELEVISION INSPECTION

1. All sanitary sewer televising work shall be done in accordance with Section 7.1.2 in the Standard Specifications for Sewer and Water Construction in Wisconsin, 6th Edition and the National Association of Sewer Service Companies (NASSCO) and inspection reporting shall be performed by a NASSCO Pipeline Assessment and Certification (PACP) certified user. Reports shall utilize NASSCO's PACP version 7.0 standards and identify defects by category. Each sanitary sewer lateral shall be assigned a NASSCO rating of 1-5.
2. The camera shall be moved through the line in a downstream direction at a uniform rate, stopping when necessary to ensure proper documentation of the sewer's condition but in no case shall the television camera be pulled at a speed greater than 30 feet per minute. **The Camera shall look up all lateral connections.** Manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation or the sewer conditions shall be used to move the camera through the sewer line.
3. If, during the inspection operation, the television camera will not pass through the entire manhole section, the Contractor shall reset up his equipment in an opposite manhole. The Contractor shall provide the additional cleaning, root cutting and mineral deposit removal so that the entire line can be televised. Any necessary cleaning to properly televise the manhole shall be performed in conformance with Section 613 of the Contract Documents.
4. In the event the section being televised has substantial flow entering the sewer between manholes, such that inspection of the sewer is impaired, the Contractor shall coordinate with the owner of the source of flow to have such flow temporarily stopped and/or reschedule television inspection of the particular section to a time when such flow is reduced to permit proceeding with the television inspection.
5. When sewer line depth of flow at the upstream manhole of the section being televised is above the maximum allowable for television inspection, the contractor shall reduce the flow to permit proceeding with the television inspection. In addition, when the sewer line is sagged or depressed, the contractor shall attempt to suction out the sewage by using a sewer jet in close proximity to the television camera.

6. Whenever non-remote powered and controlled winches are used to pull the television camera through the line, telephones, radios, or other suitable means of communication shall be set up between the two manholes or the section being inspected to ensure that adequate communications exist between members of the crews.
7. Footage measurements shall begin at the sewer line point of penetration of the upstream manhole, unless specific permission is given to do otherwise. Footage, to the nearest tenth (0.1') of a foot, shall be shown on the video data view at all times.
8. The lens of the camera shall be cleaned at each MH and when directed by the Engineer. Sewers shall not be televised during rainfall or periods when excessive clearwater is present in the sewer.

#### C. SEWER LATERAL TELEVISION

1. All sanitary sewer lateral televising work shall be done in accordance with Section 7.1.2 in the Standard Specifications for Sewer and Water Construction in Wisconsin, 6th Edition and the National Association of Sewer Service Companies (NASSCO) and inspection reporting shall be performed by a NASSCO Pipeline Assessment and Certification (PACP) and Lateral Assessment and Certification Program (LACP) certified user. Reports shall utilize NASSCO's PACP standards and identify defects by category. Each sanitary sewer lateral and main shall be assigned a NASSCO rating of 1-5.
2. The contractor shall televise at least 30 feet of each lateral, measured from the center of the mainline pipe. If the contractor cannot reach this distance, a note must be made of the reasoning.
3. All sewer lateral inspection reporting shall include all needed traffic control for the safety of the work crews and public, and any costs of contractor elected nighttime inspection.
4. Properties with more than one service shall have the laterals first inspected to see which lateral is in use. Documentation of capped or abandoned lateral shall be provided to the City.

#### D. DOCUMENTATION OF THE TELEVISION RESULTS

1. Television inspections must be documented through the use of an in-vehicle computer system. This system must be IBM compatible on an external hard drive or another approved storage medium. All defects and general information on the pipe being viewed along with an index for retrieving the information must be supplied to the City as part of the report.

2. Television inspection logs shall be typed or computer printed and shall be on a form acceptable to the City. Printed location reports shall clearly show the location of each source of infiltration discovered in relation to adjacent manholes. The contractor shall estimate and record the flow rate. In addition, other data of significance including the location of building and house service connections, joints, unusual conditions, roots, storm sewer connections, collapsed sections, presence of scale and corrosion, and other discernible features shall be recorded. A voice recording on the videotapes shall make brief and informative comments on the sewer conditions. The Contractor shall also take photographs of all faults, points of interest and where directed by the Engineer. Copies of the photographs shall be furnished to the City.
3. The measurement of distance to defects is critical in confirming the location of areas to be excavated. All inspections shall start at the center of the manhole or inlet.
4. The contractor shall make color video recordings of the data on the television monitor. A copy of each recording on an external hard drive or another approved storage medium shall be provided to the City.
5. Recorded playback shall be at the same speed that it was recorded. Slow motion or stop motion playback features may be supplied at the option of the contractor. Title to the tape will remain with the City. The Contractor shall have all necessary playback equipment readily accessible for review by the City during the project. Tape speed shall be noted on the recorded videotape.
6. The contractor shall provide a NASSCO-PACP Certified Access Database for all pipe segments evaluated as part of the contract for integration into the City's GIS computer system.
  - a. The database shall include information in a format that is compatible with City's GIS system.
    - i. Upstream Manhole – As shown on Plans
    - ii. Downstream Manhole – As shown on Plans
    - iii. Pipe Inspection ID: [Upstream Manhole]\_[Downstream Manhole]
7. Recordings shall include the following information:
  - a. Data view (Visible on screen in an inconspicuous place):
    - i. Report number
    - ii. Date of TV inspection
    - iii. Either upstream and downstream manhole numbers, **formatted to the exact manhole number as shown on the plans**, or address of the lateral being televised

- iv. Current distance along reach (counter footage to the nearest tenth of a foot)
    - v. Printed labels on the recording container and recording with location information, date, format information, and other descriptive information.
  - b. Audio:
    - i. Date and time of TV inspection, operator's name and name of adjacent street.
    - ii. Verbal confirmation of upstream and downstream manhole numbers and TV direction in relation to direction of flow.
    - iii. Verbal descriptions of pipe size, type and pipe joint length.
    - iv. Verbal description and location of each service connection and pipe defect.
    - v. Type of weather during inspection and for the previous 24-hour period.
8. Television inspection logs shall include, but are not limited to, the following information:
- a. Date, time, city, street, basin, sewer section, reference manhole number or reference address, name of operator, inspector, and weather conditions.
  - b. Pipe diameter, pipe material, section length, depth of pipe, length between joints, and corresponding videotape identification.
  - c. Location of each point of leakage.
  - d. Location of each service connection.
  - e. Location of any damaged sections, nature of damage, and location with respect to pipe axis.
  - f. Deflection in horizontal or vertical alignment of the pipe.
9. The Contractor shall provide one (1) professionally bound copy of the report to the City. A summary shall be included and shall include the television inspection logs as specified. A one-page summary sheet shall also be provided which states the sewer section, length, size, date completed, and totals.



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## **SECTION 615.1 – GENERAL CONDITIONS FOR SEWER LINING AND GROUTING**

### **615.1 – GENERAL**

#### **A. POST CONSTRUCTION TELEVISIONING OF WORK**

The Contractor shall conduct post-construction televising and documentation per Section 614 of these City Specs as incidental to the contract unless otherwise noted in the bid items, including any deliverables.

After grouting is completed, all lateral connections shall be final inspected by means, panning and tilting to view up the lateral from the mainline, by using a color CCTV system. The inspection shall be conducted as per the NASSCO Pipeline Assessment and Certification Program. One external hard drive and hard copy of reports shall be submitted

#### **B. BYPASS PUMPING**

The Contractor shall be solely responsible for maintaining commercial and residential sewer service at all times, with the exception of the lateral that is being installed. It shall be the responsibility of the Contractor, in instances of laterals with high flow rates as determined by the Contractor, to coordinate the work with the property owner(s) and/or occupant(s) at the Contractor's expense.

The Contractor shall provide for the bypass flow of sewage around the section or sections of pipe designated for relining. The bypass shall be made by plugging the line at an existing upstream manhole and pumping the flow into a downstream manhole or adjacent system. The pump and bypass lines shall be of adequate capacity and size to handle the flow and to allow CCTV observation of the mainline packer throughout liner installation..

The Contractor shall submit bypass pumping plans for review by the Engineer at least 3 working days prior to the installation of the bypass. The Contractor shall notify the Engineer at least 24 hours prior to commencement of the bypass pumping operation. The Contractor shall not be allowed to start bypassing operations until their plan is approved by the Engineer. The review of the bypassing system by the Engineer shall in no way relieve the Contractor of their responsibility and/or public liability for overflows and/or backups.

## C. CLEANING OF SEWER LINES

The Contractor shall remove all internal debris and obstructions which will interfere with the installation of the CIPP from the existing sewer line at their own expense as incidental to lining and grouting, unless otherwise noted in the bid items. All solids or semisolids resulting from the cleaning operations shall be removed from the site and disposed of at the Contractor's expense. All materials shall be removed from the site no less often than at the end of each work day. Under NO circumstance will the Contractor be allowed to accumulate debris or any other materials on the site of work beyond the stated time, except in totally enclosed containers and as approved by the Engineer. Any hazardous waste material encountered during this project will be considered a changed condition.

### 1. LINE OBSTRUCTIONS

It shall be the responsibility of the installer to clear the line of obstructions such as solids, dropped joints, roots, protruding service connections and collapsed pipe that will prevent the insertion of the liner pipe. If inspection reveals an obstruction that cannot be removed by conventional sewer cleaning equipment, then the Installer shall notify the City.

The Contractor shall remove any protruding tap, root, or deposit to the inside wall of the pipe. In no case shall the pipe be less than 95% open to flow.

At all points where the liner pipe has been exposed (such as service connection fittings, or other points where the old pipe must be removed), the liner pipe and fittings shall be encased in cement-stabilized sand or other high density material as specified by the Owner to prevent deflection due to difference in subsidence.

After the encasement material is in place and accepted by the Owner's representative, backfill is placed and compacted to required finish grade in accordance with the specifications. Particular care should be taken to ensure compaction of earth beneath the lateral pipe in order to reduce subsidence and resultant bending at the lateral connection at the sewer main.

## D. OWNER COODRDINATION

The Contractor shall coordinate with the property owner(s) and/or occupant(s) to access their lateral from the internal cleanout for any work which requires cleanout access, including but not limited to any televising or testing.

#### E. CLEANING AND DISPOSAL

After the installation work has been completed and all testing acceptable, the Contractor shall clean up the entire project area, return the ground cover to grade, and restore any disturbed areas in-kind or as indicated on the plans, at the Contractor's expense unless otherwise noted. All excess material and debris not incorporated into the permanent installation shall be disposed of by the Contractor at their expense.

#### F. RESPONSIBILITY FOR OVERFLOW OR SPILLS

It shall be the responsibility of the Contractor to schedule and perform his work in a manner that does not cause or contribute to incidence of overflows or spills of sewage from the sewer system. In the event Contractor's work activities contribute to overflows or spills, the Contractor shall immediately take appropriate action at their own expense to contain and stop the overflow, clean up the spillage, disinfect the area affected by the spill, and notify the Engineer and/or property owner in a timely manner.

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## **SECTION 615.2 – LINING OF SEWER MAINS AND LATERALS**

### **615.2 - SEWER RELINING**

#### **A. SCOPE**

This section describes the procedures and the work necessary for the reconstruction of existing pipelines and conduits by the installation of structural cured-in-place pipes (CIPP). A CIPP is formed by the insertion of a resin-impregnated flexible felt tube into the existing pipe. The tube is expanded to tightly fit against the original conduit and then cured by circulating hot water or introducing controlled steam within the tube.

The finished CIPP shall extend over the installation length in a continuous, tight fitting, watertight, pipe-within-a-pipe. All liners shall be smooth walled when set.

The Contractor shall provide all materials, labor, equipment, cleaning, and television inspection of the sewer to be lined, installation of the liner, reconnection of service laterals, final television inspection, and testing of the lined pipe system. The Contractor shall also submit a written report of the sanitary sewer cleaning. This report shall identify the sewer segments cleaned and the type and volume of debris removed from the sanitary sewers.

The Contractor shall contact the property owner/residents and businesses within the project limits to inform them of the project and provide them with any information deemed necessary for the successful performance of the contract, and to inform them of temporary sewer service disconnections.

If the Contractor damages the sewer during construction and is unable to complete the lining in a satisfactory manner, the cost of the excavation and/or repairs shall be included in the unit price bid for the cured in place liner.

#### **1. LATERALS**

It is the intent of this specification to provide for the rehabilitation of sanitary sewer laterals.

The work to be performed under this Section includes the furnishing of all materials, parts, labor, tools, equipment, and supervision necessary for cleaning and CCTV inspection of the laterals to be lined, liner installation, all quality controls, provide samples for performance of required material tests, final CCTV television inspection, testing of lined pipe system and warranty work, all as specified.

The CIPP shall fit sufficiently tight within the existing lateral so as to not leak at the ends of the liner. If leakage occurs through the wall of the pipe, the liner shall be repaired or removed as recommended by the CIPP manufacturer.

Final approval of the liner installation will be based on lateral televising after CIPP liner installation is complete.

The installed CIPP shall have a long term (50 year) corrosion resistance to the typical chemicals found in domestic sewage.

All materials furnished, as part of this contract shall be marked with detailed product information, stored in a manner specified by the manufacturer and tested to the requirement of this contract.

When cured, the liner shall extend to the downstream-most lateral pipe joint.

The new CIPP lateral shall be a structurally sound, joint-less, corrosion resistant, watertight, and free of all defects that will affect the long-term life and operation of the pipe. The Contractor is responsible for proper, accurate and complete installation of the CIPP.

Neither the CIPP system, nor its installation, shall cause adverse effects to any of the property owner's or City's processes or facilities. The use of the product shall not result in the formation or production of any detrimental compounds or by-products at the receiving wastewater treatment plant. The Contractor shall notify the Engineer and identify any by-products produced as a result of the installation operations, test and monitor the levels, and comply with any and all local waste discharge requirements.

The Contractor shall cleanup, restore existing surface conditions and structures, and repair any of the CIPP system determined to be defective at their own expense unless otherwise noted in the bid items.

The Contractor shall conduct installation operations and schedule cleanup in a manner to cause the least possible obstruction and inconvenience to traffic, pedestrians, businesses, and property owners or tenants.

## B. REFERENCES - LINING

This specification references American Society for Testing and Materials (ASTM), National Association of Sewer Service Companies (NASSCO), and American Water Works Association (AWWA) standards which are made part hereof by reference, and shall be the latest edition and revision thereof. If there is a conflict between these standards and this specification, this specification will govern. The ASTM testing specifications referenced are as follows:

1. ASTM D543 Standard Practices for Evaluating the Resistance of Plastics to Chemical Reagents
2. ASTM D638 Standard Test Methods for Tensile Properties of Plastics



3. ASTM D790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
4. ASTM D792 Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
5. ASTM D903 Standard Test Methods for Delamination of Plastic Composites
6. ASTM D2290-17 Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics
7. ASTM F1216 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the In-situ and Curing of Resin-Impregnated Tube
8. ASTM F1743 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe
9. ASTM D5813 Standard Specification for Cured-in-Place Thermosetting Resin Sewer Pipe

#### C. QUALITY CONTROL

Though the process may be licensed, no change of material, design values, or procedures may be made during the course of the work without the prior written approval of the Engineer. All liner to be installed under this contract may be inspected at the point of manufacture for compliance with these specifications by

the Engineer. The Contractor shall require the manufacturer's cooperation in these inspections. The cost of the plant inspection shall be the responsibility of the Engineer.

At the time of manufacture, each lot of liner shall be inspected for defects. At the time of delivery, the liner shall be homogeneous throughout, uniform in color, and free of cracks, holes, foreign materials, blisters, or deleterious faults.

The Contractor shall have a Quality Control Plan or Procedure in place which allows the Engineer to monitor the resin impregnation process.

#### D. WARRANTY

All lining work, including any lateral lining, shall be guaranteed for a period of 3 years from the date of substantial completion granted in writing by the Engineer unless otherwise stipulated in writing by the City. During this period, all defects discovered by the City shall be removed and replaced by the Contractor in a satisfactory manner at no cost to the City. The City may conduct independent

television inspections, at its own expense, of the lining work at any time prior to the completion of the warranty period.

## E. SUBMITTALS

### 1. QUALIFICATIONS FOR INSTALLERS OF APPROVED LINING MATERIALS

The Contractor shall submit all required pre-qualification product, manufacturer, and installer documents to the Engineer. For an installer to be accepted, the installer must satisfy all of the following:

- a. Insurance, financial and bonding requirements of the City
- b. Minimum of three (3) years of active experience in the commercial installation of the product proposed
- c. Successfully installed at least 500 cured-in-place service laterals of the proposed product in sewer systems in the United States
- d. Must have minimum three (3) years of experience in the installation of lateral cured-in-place lining
- e. The Contractor shall employ a minimum of 1 foreman and 2 crew members with experience of at least 50 liner installations
- f. The Contractor shall have the equipment available for the installation and testing of the lateral liner from inside the internal cleanout
- g. Acceptable documentation of these minimum requirements shall be submitted to the Engineer, and any intentional misrepresentation of references will be grounds for disqualification
- h. Contractor/Manufacturer submit evidence of installer training, testing, and/or certification of being trained to install the product by the Contractor/Manufacturer for the product.

### 2. PRODUCT QUALIFICATION

Sewer rehabilitation products submitted for approval shall provide third-party test results supporting the short-term and long-term performance, as well as the structural strength of the product. No product will be approved without independent third-party testing verification. The tube and resin manufacturers shall be third-party certified by United States recognized organizational standards. Proof of certification shall be required for approval.

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the structural strength of the product. No product will be approved without independent third-party testing verification. The tube and resin manufacturers shall be third-party certified by United States recognized organizational standards. Proof of certification shall be required for approval.

- a. ENHANCERS – The use of proven materials that serve to enhance the pipe performance specified herein will be allowed. Proven materials must have passed independent third-party laboratory testing, not excluding long-term structural behavior testing, and must have been successfully installed to repair failing host pipes in the U.S. for at least two (2) years.
- b. TESTING – Submit certified test reports demonstrating that the exact resin/liner combination to be used for this project meets the requirements for initial structural properties (performed in accordance with ASTM F1216 and ASTM D790) and chemical resistance (performed in accordance with ASTM F1216 – Appendix X2). Also submit certified test reports demonstrating that the exact resin and comparable liner to be used for this project has been tested for long term flexural modulus of elasticity and long-term flexural strength (i.e. 10,000-hour creep testing performed in accordance with ASTM D2990 for design conditions applicable to this project).

### 3. PROOF OF PRODUCT USAGE

Only cured-in-place lining products with a proven track record of successful installations will be approved. For cured-in-place liner product to be accepted, it must meet or exceed the following criteria:

- a. The product must have been used in three successful cured-in-place lateral lining installation contracts of similar size and scope in the United States.
- b. CIPP FOR LATERALS – The product must have been successfully used and installed in a minimum of 2,000 lateral liner installations, and the product must be capable of being installed and tested from the internal cleanout.

Proven materials must have passed independent third-party laboratory testing, not excluding long-term structural behavior testing, and must have been successfully installed to repair failing host pipes in the United States for at least two (2) years. For a product to meet prequalification as a commercially acceptable product, a minimum of 100,000 feet of successful waste water collection system installations in the US must be documented to assure commercial viability of the process.

- c. LIMITATION OF UNPROVEN TECHNOLOGY: The use of proven materials that serve to enhance the pipe performance specified herein will

be allowed at the discretion of the Engineer. To limit the City's exposure to unproven pipe reconstruction or rehabilitation products while permitting the establishment and growth of such new product technologies where warranted, the City has established the following parameters:

- i. YEARLY FOOTAGE RESTRICTION: If the new product Contractor/Manufacturer does not have a minimum of 2 years of commercial experience in installing/manufacturing the proposed rehabilitation product for essentially trenchless pipeline reconstruction in the United States, the maximum of that Contractor's/Manufacturer's new product footage that will be installed in City's system during any 12-month period will not exceed 5% (at the time of the bid) of the total footage of that Contractor's/Manufacturer's new product installed and accepted in US sewer systems.
- ii. DOCUMENTATION: Footage in b.1. above will be documented by the Contractor/Manufacturer of the proposed product. Documentation will include the name, address and reference phone numbers of the users, length and diameter of the product, contract number or name, and official acceptance date by the user.
- iii. FINAL ACCEPTANCE: The limitations in b.1. above and documentation requirements in b.2. will be dropped after 3 years of successful performance/maintenance of the City's system and as the product is deemed successful by the Engineer.
- iv. TRIAL INSTALLATION: Contractor/Manufacturer may be required to install a minimum test section of approximately 300 feet under the supervision of the Engineer for his review prior to the award of Contract. The test section is to be designated by the Engineer and paid for by the City at 75% of the unit or lump sum prices bid.

#### 4. DESIGN GUIDE SUBMITTAL

Contractor/Manufacturer shall submit the Engineering design guide and quality control procedures for the liner manufacture and installation, including detailed inspection, testing of physical properties, retention of production samples, and taking of field samples. Test results from 10 previous installations must be submitted and shall meet the City's current standards and requirements.

- a. DESIGN CALCULATIONS – submit structural design calculations and specification data sheets listing all parameters used in the liner

design and thickness calculations based on Appendix XI of ASTM F1216 for each pipe segment/lateral.

See Section 615.2 G for more details.

#### 5. INSTALLATION QUALITY CONTROL PLAN

Submit plan or procedures that ensure proper materials and procedures are used in liner shipping and storage and in the resin impregnation process. Submit installation and quality control plan, including mainline sewer and lateral cleaning plan and cleanliness requirements, liner shot plan and sequence, liner installation standard procedures, temperature monitoring plan, and plan to manage flow to/from laterals during lining. The Contractor's Quality Control Plan shall be submitted for review by the Engineer at least 2 weeks prior to the first CIPP installation.

#### 6. CONTINGENCY PLAN

Submit plan that includes methods and equipment to be used to repair unacceptable liner defects, for removing failed liners, and for availability and accessibility of backup equipment such as air compressors and boilers.

#### 7. MATERIALS AND CURING DETAILS

The Contractor shall provide submittals on all lining materials and resins and shall furnish manufacturer certification that the lining materials are in compliance with the specifications, codes, and standards referenced herein. The submittals shall include details of all component materials and construction details including complete manufacturer's recommendations for storage procedures and temperature control (step curing temperature/hours at each stage for each section thickness and length) handling, inserting the liner and curing details.

#### 8. BYPASS PUMPING

The Contractor shall submit bypass pumping plans for review by the Director of Public Works at least 3 working days prior to the work. The Contractor shall notify the Director of Public Works 24 hours prior to commencement of the bypass pumping operation. The Contractor's plan for bypass pumping shall be approved by the Director of Public Works before the Contractor will be allowed to start bypass pumping.

#### 9. CIPP FIELD SAMPLES

To verify physical properties, the Manufacturer shall submit a minimum of 10 test results from previous field installations of the same resin system and tube materials as proposed for the actual installation. These test results must verify

that the CIPP physical properties specified herein have been achieved in previous field applications.

## 10. DOCUMENTATION OF LINER INSTALLATION

The Contractor shall submit installation reports for resin impregnation and a curing log of each CIPP (see Section 615.2 J. and K. for details). Installation documentation shall be submitted weekly.

## F. MATERIALS

The minimum length of the CIPP shall be that deemed necessary by the Contractor to produce a finished pipe tightly formed to the existing pipe and which effectively spans the distance from the inlet to the outlet of the respective manholes.

The wall color of the interior pipe surface of the pipe after installation shall be a light reflective color so that a clear detail examination with closed circuit television inspection equipment may be made.

### 1. TUBE

The tube material and design considerations shall meet the requirements of ASTM F1216, Section 5.1. and modified as follows:

- a. The tube shall consist of one or more layers of absorbent fabric capable of carrying resin, and capable of withstanding installation pressures and curing temperatures. The tube shall be compatible with the resin system used.
- b. The tubes shall have a uniform thickness that, when compressed at installation pressures, will equal the specified nominal tube thickness.
- c. The tube shall be fabricated to a size that, when installed, will tightly fit the internal circumference and length of the original pipe. The tube material shall be able to stretch to fit irregular pipe sections and negotiate bends. Allowance should be made for circumferential stretching during inversion.
- d. The outside layer of the tube (before inversion) shall be plastic coated with a translucent flexible material that clearly allows inspection of the resin impregnation (wetout) procedure. The plastic coating shall not be subject to delamination after curing. The coating shall be compatible with the resin system used.
- e. The tube shall be homogeneous across the entire wall thickness, containing no intermediate or encapsulated elastomeric layers. No

materials shall be included in the tube that are subject to delamination in the CIPP.

- f. The wall color of the interior pipe surface of the CIPP after installation shall be white or light brown so that a clear detail examination with closed circuit television inspection equipment may be made.
- g. For pull-in methods of lining, the resin soaked felt tube shall have an outer plastic lining that effectively prevents the scrape off or wash off of resin. The outer layer shall have slits cut into the plastic just prior to the pull-in that allow outward migration of resin.
- h. The bond between all CIPP layers shall be strong and uniform. All layers, after cure, must form one homogeneous structural pipe wall with no part of the tube left unsaturated by resin. Delaminations in the test samples will be cause for rejection of the line segment rehabilitated. If, in the opinion of the Director of Public Works, the video of the finished liner fails to show similar delamination, then more sampling and retesting of the CIPP liner may be done by the Contractor to verify or refute the previous tests. Costs of the retests shall be the responsibility of the Contractor.

## 2. RESIN

The resin used shall be a thermoset resin system that is compatible with the CIPP installation. The resin shall be able to cure in the presence of water and the initiation temperature for cure shall be less than 180°F. The resin shall be a corrosion resistant polyester, vinyl ester, or epoxy resin and catalyst system that, when properly cured within the composite liner assembly, meets the requirements of ASTM F1216 and these City Specs.

Thixotropic agents that enable the resin system to possess pseudo plastic fluid flow properties, and that do not interfere with visual inspection, shall be added for viscosity control and to minimize resin washout. Resins may contain pigments that do not interfere with visual inspection of or the physical testing of the CIPP. Filler proprietary materials may be added as long as the final pipe product can meet or exceed the minimum standards set forth in these City Specs.

### a. RESIN IMPREGNATION

The tube shall be vacuum-impregnated with resin (wet-out) under controlled conditions. The volume of resin used shall be sufficient to fill all voids in the tube material at nominal thickness and diameter. The volume shall be adjusted by adding excess resin for the change in resin volume due to polymerization, and to allow for any migration of resin into the cracks and joints in the original pipe. A roller system shall be used to uniformly distribute the resin throughout the tube.

Unsaturated areas of the impregnated tube that are to be installed in the host pipe (the downstream turn back and the downtube are excluded) will be cause for rejection. Should the unsaturated section of the tube be noticed before inversion, then the unsaturated area of the tube shall be re-impregnated with resin using methods developed by the Contractor and to the satisfaction of the Engineer.

The Contractor shall designate a location where the CIPP will be vacuum-impregnated prior to installation. The Contractor shall allow the Engineer to inspect the materials and procedures used to vacuum-impregnate the tube.

### 3. LATERAL LINING

- a. **LINER ASSEMBLY** – The liner assembly shall be continuous, and contiguous, in length and consist of one or more layers of absorbent needle punched felt, circular knit or circular braid that meet the requirements of ASTM F1216 and ASTM D5813 Sections 6 and 8. No intermediate or encapsulated elastomeric layers shall be in the textile that may cause delamination in the CIPP. The textile tube and sheet shall be constructed to withstand installation pressures, have sufficient strength to bridge missing pipe segments, and flexibility to fit irregular pipe sections. The resin saturated textile tube and sheet shall meet ASTM F1216, 7.2 as applicable, and the tube shall have 5% to 10% excess resin distribution (full resin contact with the host pipe) that when compressed and cured will meet or exceed the design thickness.
- b. **LATERAL LINER TUBE** – The exterior of the lateral liner tube shall be laminated with an impermeable, translucent flexible membrane. Longitudinal seams in the tube shall be stitched and thermally sealed. The lateral tube will be continuous in length. The lateral tube will be capable of conforming to offset joints, bends, bells and disfigured pipe sections. For pipe configurations that contain pipe diameter transitions, the transition liner tube must be formed by the manufacturer prior to installation to ensure proper wall thickness per ASTM F1216.
- c. **BLADDER ASSEMBLY** – The liner assembly shall be surrounded by a second impermeable, inflatable, invertible, flexible translucent membrane bladder that will form a liner/bladder assembly. The translucent bladder shall facilitate vacuum impregnation while monitoring the resin saturation process.
- d. **WATER** – Water is only available from select hydrants as identified by the City of Wauwatosa Water Department. See Section 605.1.02(A) for further details.



## G. DESIGN CONSIDERATIONS

### 1. BUCKLING

The Contractor shall be responsible for all aspects of the design of the liner pipe. The Contractor shall guarantee that the installed liner is capable of sustaining outside loads, resisting chemical attack that normally occurs in sanitary and storm sewers, and will maintain hydraulic characteristics over a 50 year design life. No design shall rely on bonding to the existing pipe or rely on the remaining strength of the existing pipe. The minimum acceptable design criteria follows.

The Liner Pipe shall be designed to fit the existing sanitary or storm sewer. Provisions shall be made in the manufacturing process such that the SDR's will be achieved after the pipe has been expanded to the existing pipe.

The existing sewer shall be considered to be in a fully deteriorated gravity pipe condition, and that the original pipe is not structurally sound and cannot support soil and live loads. The CIPP shall be designed to support hydrostatic, soil and live loads. The CIPP liner shall be designed in accordance with ASTM1216, Appendix X1 and the following design conditions:

- a.  $H_w$  = height of water above top of pipe, ft. (lesser of 12 ft. or exist. cover)
- b.  $H$  = height of soil above top of pipe, ft. (use maximum existing cover)
- c.  $C$  = reduction factor for long term effects = 0.50 to 0.66
- d.  $N$  = factor of safety = 2.0
- e.  $E'_s$  = modulus of soil reaction, psi = 1,250 psi
- f.  $E_L$  = long term (50 year) flexural modulus of elasticity (per ASTM D790) = 200,000 psi (minimum)
- g. Existing Soil Density, lb./cu.ft. = 130 pcf
- h. Live Load, lb./sq.ft. = AASHTO  $H_{20}$  Wheel Load of 16,000 lb.
- i. Initial Flexural Strength (per ASTM D790) = 4,500 psi
- j. Long-Term Flexural Strength (per ASTM D790) = 2,250 psi
- k. Minimum ovality of host pipe = 3%
- l. Assume no bonding to original pipe.
- m.  $E$  = initial flexural modulus of elasticity (ASTM D790) = 400,000 psi

NOTE: Flexural modulus has been reduced for long term loading in accordance with the recommendations contained in AASHTO Standard Specifications for Highway Bridges, Section 18, "Soil-Thermo Plastic Pipe

Interaction System." The Director of Public Works has selected this source for 50 year design life. The Contractor may submit other third-party source information for consideration. The Director of Public Works will be the sole judge of the parameters used in design.

**EXCLUSIONS:** Any layers of the tube that are not saturated with resin prior to the insertion into the existing pipe shall not be included in the structural CIPP wall thickness. No factors of design relating to adhesion to the existing pipe will be allowed in the design.

## 2. HYDRAULIC CAPACITY

Overall condition of the pipeline system shall be maintained with its hydraulic profile as large as possible. The CIPP shall have a minimum of the full flow capacity of the original pipe before rehabilitation. Offsets of two adjacent pipe sections more than 25% of the diameter of the pipe shall be repaired by grinding and/or straightening the offset to be a usable shape in a manner mutually acceptable between the Contractor and the Director of Public Works.

## 3. LATERAL TUBES

The CIPP design for the lateral tube shall assume no bonding to the original pipe. The resin saturated lateral tube shall place the resin in full contact with the host pipe. The cured liner shall provide coating on the interior of the sewer mainline or lateral piping for an improved flow rate. The liner shall be smooth and have an average roughness coefficient "n" factor of 0.013 or lower.

# H. TESTING REQUIREMENTS

## 1. CHEMICAL RESISTANCE

The Contractor shall certify that the CIPP meets the chemical resistance requirements of ASTM F1216, Appendix X2. Samples for testing shall be taken of tube and resin system similar to that proposed for actual construction. It is required that samples with and without plastic coating meet these chemical testing requirements.

## 2. HYDRAULIC CAPACITY

The Contractor shall certify that the CIPP shall have a minimum of the full flow capacity of the original pipe before rehabilitation. Calculated capacities may be derived using a commonly accepted roughness coefficient for the existing pipe material taking into consideration its age and condition. The roughness coefficient of the CIPP shall be verified by third party test data.

### 3. SAMPLING AND TESTING

The Contractor shall obtain samples and perform the tests as specified in ASTM F 1216 Section 8 to verify that the actual installation meets the required property specifications. Also refer to these City specifications for requirements.

## I. INSTALLATION RESPONSIBILITIES FOR INCIDENTAL ITEMS

### 1. SAFETY

The installer shall carry out his operation in strict accordance with all OSHA and manufacturers' safety requirements. Particular attention is drawn to those safety requirements involving entering confined spaces.

### 2. TRAFFIC CONTROL

Traffic Control shall be the responsibility of the Contractor and shall conform to MUTCD and other portions of these specifications and the contract Special Provisions. The Contractor shall maintain traffic during working periods. During nonworking periods, the Contractor shall open the entire roadway to traffic.

### 3. ACCESS

It will be the responsibility of the owner to locate and designate all manhole access points open and accessible for the work, and provide rights of access to these points. If a street must be closed to traffic because of the orientation

of the sewer, the Contractor shall institute the actions necessary to do this for the mutually agreed time period.

### 4. WATER USAGE

Water is available from specific City hydrants for cleaning, inversion and other work items requiring water. However, the Contractor shall secure permission from the Water Dept. and obtain the necessary permits and pay the fees associated with the permit. Special reference is made to Section 610.1.03A of these City specs.

### 5. INSPECTION OF PIPELINES

Inspection of pipelines shall be performed by NASSCO PACP certified personnel trained in locating breaks, obstacles and service connections by closed circuit television. The interior of the pipeline shall be carefully inspected to determine the location of any conditions which may prevent proper installation of the impregnated tube including, but not limited to,

protruding taps, collapsed or crushed pipe, and reductions in cross sectional area of more than 20%. Televising and related documentation shall be per section 614 of these City Specs.

## J. INSTALLATION OF CIPP IN MAINLINE SEWERS

### 1. INSTALLATION

- a. The wet out tube shall be inserted through an existing manhole or approved access point by means of an inversion process and the application of a hydrostatic head sufficient to extend it to the next designated manhole or termination point.
- b. Tube installation forces or pressures shall be limited so as not to stretch the tube longitudinally by more than 5% of the original length.
- c. Before the installation begins, the tube manufacturer shall provide the minimum pressure required to hold the tube tight against the existing conduit, and the maximum allowable pressure so as not to damage the tube. Once the installation has started, the pressure shall be maintained between the minimum and maximum pressures until the installation has been completed.
- d. The CIPP liner shall not be installed at a rate over two feet per second as gauged at the point of insertion at the top of the water column.
- e. The existing conduit shall be dewatered for any CIPP installation that does not use an inversion method to expand the tube against the pipe wall.
- f. For *pull-in methods*, a proofing section shall be pulled through the existing conduit prior to installation. The proofing section shall consist of the materials proposed for rehabilitation. The minimum length of the proofing section shall be 5 feet in length and shall be of like diameter and thickness. If proofing section is damaged, point repairs shall be made to the existing conduit. The proofing process shall be repeated using a new proofing section to verify effective point repairs. Repeat proofing and point repair process until proofing results in no damage to proofing section. Installation of CIPP using pull-in methods can begin after successfully proofing the existing conduit .
- g. The standard inversion technique involves the release of any entrapped air or vapor from the turn back end of the uncured CIPP. Typically, this process requires the cutting of the outer plastic lining to allow the air/vapor to escape prior to the submergences of the turn back end of the uncured CIPP. The cuts in the plastic shall be repaired with suitable tape and glue prior to the submergence of the turn back end in the inversion column.

- h. The use of a lubricant during inversion is recommended to reduce friction. This lubricant should be poured into the water in the downtube or applied directly to the tube or inflation bladder. Lubricant shall not be used in process where impermeable coatings are perforated prior to tube installation. The lubricant used should be a nontoxic, oil-based product that has no detrimental effects on the tube or boiler and pump system, will not support the growth of bacteria, and will not adversely affect the fluid to be transported.
- i. Should and instance arise where two liners are overlapped, the area where they meet shall be sealed with a hydrophilic O-ring or other suitable material approved by the Engineer.
- j. The City will entertain proposals for other methods of installation provided the Contractor submits adequate documentation supporting the method. The Director of Public Works will have the final determination of acceptability any installation method. The Contractor shall base his bid on the specified installation methods.

## 2. CURING

- a. After installation is completed, a suitable heat source and water or steam recirculation equipment are required to circulate heated water throughout the pipe. The equipment should be capable of delivering hot water or steam throughout the section to uniformly raise the water temperature above the temperature required to effect a cure of the resin. Water temperature in the line during the cure period should be as recommended by the resin manufacturer.
- b. The heat source should be fitted with suitable monitors to gauge the temperature of the incoming and outgoing water supply. Another such gauge should be placed between the impregnated tube and the pipe invert at the termination to determine the temperatures during cure.
- c. Initial cure will occur during temperature heat-up and is completed when exposed portions of the new pipe appear to be hard and sound and the remote temperature sensor indicates that the temperature is of a magnitude to realize an exotherm or cure in the resin. After initial cure is reached, the temperature should be raised to the post-cure temperature recommended by the resin manufacturer. The post-cure temperature should be held for a period as recommended by the resin manufacturer, during which time the recirculation of the water and cycling of the boiler to maintain the temperature continues. The curing of the CIPP must take into account the existing pipe material, the resin system, and ground conditions (temperature, moisture level, and thermal conductivity of soil).

### 3. COOL-DOWN

The CIPP should be cooled to a temperature below 100°F (38°C) before relieving the hydrostatic head. Cool-down may be accomplished by the introduction of cool water into the CIPP to replace water being drained from a small hole made in the downstream end. Care should be taken in the release of the static head so that a vacuum will not be developed that could damage the newly installed pipe.

### 4. INFLATION BLADDER REMOVAL

For pulled-in place installation techniques where the inflation bladder is designed to not bond to the CIPP, all portions of the bladder material must be removed from the CIPP.

## K. INSTALLATION OF CIPP LATERAL LINING

### 1. EXISTING LATERAL INSPECTION AND PIPE PREPARATION

Inspect lateral prior to lining operations per Section 614 of these City Specs. This initial inspection will determine if the lateral is a candidate for lining rehabilitation. Any issues discovered during this initial investigation that may have an effect on the lining process needs to be discussed with the Engineer to determine how we will proceed. This initial inspection is incidental to the lateral lining bid item.

Cleaning of the lateral in preparation for the lining process is incidental to the lining pay items in this contract. Pipe preparation should be in accordance with manufacturer's specifications to ensure the host pipe is best prepared to

receive the new lateral liner. The lateral shall be cleaned using industry standard cleaning heads, and provide a sufficient cleaned length to ensure existing lateral is prepared for the CIPP lining. It is the responsibility of the Contractor to verify, prior to installation, that all internal debris has been removed from the sewer lateral.

If the lateral has obstructions that the Contractor believes require the use of alternative cleaning and preparation techniques, the Contractor shall notify the Engineer. The Engineer may authorize in writing the use of contingent items for the heavy cleaning of the lateral.

The Contractor is also responsible for contacting the Engineer in case of debris or defects in the mainline sewer that would prohibit the CIPP lining of the specified lateral. The Engineer may authorize in writing the use of

contingent items to perform heavy cleaning of the mainline sewer and/or perform a mainline spot repair.

Inspect and confirm the inside diameter, alignment, length and condition of each lateral to be lined. Field measure lateral diameters, including transitions in lateral diameters, and identify exact locations of fittings and bends. All dimensions shall be field verified by the Contractor prior to delivery of the liner. If unknown physical conditions in the work area that differ materially from those ordinarily encountered are uncovered during the investigation, the Contractor shall notify the Engineer.

If the existing lateral between the mainline sewer and the internal cleanout is found to be damaged through no act of the Contractor, contains an obstruction that cannot be removed by the conventional cleaning equipment, or contains a sag that is unacceptable to the Engineer, submit inspection documentation to the Engineer. The Engineer may authorize the use of contingent bid items to repair the defects in the lateral.

## 2. RESIN IMPREGNATION

The liner assembly is encapsulated within the translucent bladder (liner/bladder assembly) the entire liner shall be saturated with the resin system (wet-out) under controlled vacuum conditions. The volume of resin used shall be sufficient to fill all voids in the textile lining material at nominal thickness and diameter. The volume shall be adjusted by adding 5-10% excess resin for the change in resin volume due to polymerization and allow for any migration of resin volume due to polymerization and to allow for any migration of resin into the cracks and joints in the original pipe. No dry or unsaturated area in the lateral tube shall be acceptable upon visual inspection. The Contractor shall complete a wet-out process control sheet for every lining completed. The control sheets shall provide, at a minimum, the following information:

- Liner Manufacturer
- Liner Diameter
- Number of Layers
- Resin Amount
- Resin Type
- Resin Manufacturer
- Batch Number (Resin)
- Hardener Name
- Batch Number (Hardener)
- Mixing Ratios
- Vacuum Pressure of Impregnation Process
- Wet-Out Start Time and Date

### 3. LINER INSERTION

The lateral tube and inversion bladder shall be inserted into the launching device. The launching device is inserted into the pipe and pulled to the point of repair. The pull is complete when the lateral tube is exactly aligned with the lateral pipe connection. The lateral tube is completely protected during the pull. The liner assembly shall not be contaminated or diluted by exposure to dirt or debris during the pull.

### 4. CURING

After insertion is complete, apply a suitable recirculation system capable delivering air, steam, or water, as required by the liner system manufacturer (or ambient temperature curing), uniformly throughout the section to achieve a consistent cure of the resin. Maintain the curing temperature as recommended by the liner system manufacturer. Prevent excessive temperatures that could scald or bubble the liner.

- a. WATER INVERSION PROCESS – If water is used to accomplish the inversion process, the Contractor shall complete an installation process control sheet for every lining completed. The control sheets shall provide the following information:
  - Liner Length
  - Hydrostatic Head at Point of Inversion
  - Hydrostatic Head at Termination Point
  - Time When Inversion Process Starts
  - Time When Curing Begins and Ends
- b. AIR INVERSION PROCESS – If air is used in the inversion process, liner manufacturer shall provide the minimum pressure required to hold the tube tightly against the host pipe, and the maximum pressure allowable to not damage the tube. Once the inversion has started, the pressure shall be maintained between the recommended pressure ranges until the inversion has been completed. Should the pressure deviate from within this range, the installed liner shall be removed. The Contractor shall complete an installation process control sheet for every lining completed. The control sheets shall provide the following information:
  - Liner Length
  - Minimum Pressure
  - Maximum Pressure
  - Time and Pressure When Inversion Process Started (and every 10 minutes until inversion process completes)
  - Time When Curing Begins and Ends



## 5. COOL-DOWN

The CIPP shall be cooled to a temperature below 100°F (38°C) before relieving the hydrostatic head. Cool-down may be accomplished by the introduction of cool water into the CIPP to replace water being drained from a small hole made in the downstream end. Care shall be taken in the release of the static head so a vacuum will not be developed, which could damage the newly installed pipe.

## 6. REMOVAL

After the curing process is complete, the Contractor shall remove all installation and curing equipment from the host pipe. No material other than the cured CIPP shall remain in the host pipe. Remove any excess liner material protruding into the sewer main or manhole by remote robotic cutting equipment, or manual means, in accordance with the manufacturer's instructions. Provide a finished CIPP that is continuous and as free as commercially practicable of visual defects, including but not limited to foreign inclusions, dry spots, pinholes, delamination, and wrinkles in any location in excess of 5% of the host pipe's inside diameter.

## L. REINSTATEMENT OF BRANCH CONNECTIONS

After the pipe has been relined and tested (refer to Section 610.3.06.K) only existing active service connections as shown on the plans shall be reconnected. The reconnection of services shall be done without excavation, unless otherwise specified by Owner; this will be accomplished from the interior of the pipeline by a television camera directed cutting device. The location of the service shall be made by inspection of the preconstruction TV tape and other proven detection

methods. The Contractor shall remove and dispose of any pieces or shavings of the liner that result from the opening of the service connection.

All recut service connection shall be brushed smooth and free of burrs and frayed edges, or any restriction preventing free wastewater flow and shall be reinstated to 90% of the original opening. Overcutting of the opening will be cause for rejection. In the event of overcutting or other defect, the Contractor shall either make an open cut saddle type point repair or use an approved method of short-lining of the service that overlaps the overcut or defective portion of the sewer liner.

## M. ANNULAR SEAL AT MANHOLES

All manhole to CIPP seals shall be of the hydrophilic elastomer type capable of forming a watertight seal in the presence of water that will fill the annular space without gaps. The material used shall be either Hydrotite or an approved equal.

## N. TESTING

1. For each inversion length designated by the Engineer in the contract documents or purchase order, one CIPP sample shall be cut from a section of cured CIPP at an intermediate manhole or at the termination point that has been inverted through a like diameter pipe which has been held in place by a suitable heat sink, such as sandbags. (Note: In areas with limited space and larger diameter pipes, other sampling techniques may be required). In pipes greater than 18-inches in diameter, other sampling and curing techniques may be required. All samples shall be labeled before shipment to the testing laboratory and a duplicate sample shall be provided to the Engineer.
2. The sample should be large enough to provide a minimum of three specimens and a recommended five specimens for flexural testing and also for tensile testing, if applicable. The full CIPP sample wall thickness shall be tested, whenever possible. If the sample is irregular, distorted, or of such thickness that proper testing is inhibited, then the wall thickness shall be machined away from the inside pipe face of the sample only. Thus, the test specimen shall be cut from the outside pipe face of the CIPP sample. For specimens greater than 1/2 inch (12.70 mm) depth, the width-to-depth ratio of the specimen shall be increased to a minimum of 1:1 and shall not exceed 4:1. Test specimens shall be oriented on the testing machine with the interior surface of the CIPP in tension. The following test procedures should be followed after the sample is cured and removed.
  - a. FLEXURAL (BENDING) PROPERTIES – The initial tangent flexural modulus of elasticity and flexural stress should be measured for gravity and pressure pipe applications in accordance with Test Method D 790, Test Method I Procedure A, and should meet the requirements of these City Specs.
  - b. TENSILE PROPERTIES – The tensile strength should be measured for pressure pipe applications in accordance with Test Method D 638 and must meet the requirements of these City Specs.

### 3. GRAVITY PIPE LEAKAGE TESTING

Leakage testing of the CIPP shall be conducted after cure and prior to the reinstatement of laterals while under hydrostatic pressure. The downstream (turn back) end of the liner pipe shall be cut out to within two inches of the manhole wall. A standard inflatable sewer plug shall be inserted into the liner pipe and inflated to a pressure that will withstand the static head provided by the water filled down tube. The liner pipe shall then be refilled with water. The water level of the downtube will be observed for five minutes by the Engineer or their representative. The change in water elevation, if any, will be noted, the water loss rate calculated and compared to the acceptable leakage standard for new pipes. The test results shall be judged against the exfiltration limits shown in Table 5 of Section 3.7.2 of the Standard Specs and in general conformance with Section 3.7.4.

### 4. DELAMINATION TEST

For all CIPP products, a delamination test should be performed on each installation length. The sample shall be fabricated from material taken from the tube and the resin/catalyst system used and cured in a clamped mold placed in the downtube. Delamination testing shall be in accordance with ASTM D 903 with the following exceptions:

- a. The rate of travel of the power-actuated grip shall be 1 inch (25 mm)/minute.
- b. Five test specimens shall be tested for each inversion specified.
- c. The thickness of the test specimen shall be minimized but should be sufficient to adequately test delamination of nonhomogeneous CIPP layers.
- d. The peel or stripping strength between any nonhomogeneous layers of the CIPP laminate should be a minimum of 10 lb/in. (178.60 g/mm) of width for typical CIPP applications.

### O. INSPECTION & ACCEPTANCE

After all testing and work is completed, the contractor shall internally inspect the CIPP installation by closed circuit television and provide the City with video showing the completed work including the restored conditions. The connections and seals at manholes shall be visually inspected.

1. The relining pipe shall be continuous, without joints over the entire length of the pipe. The liner shall be free of all visual and material defects except those resulting from pre-lined conditions (such conditions shall be brought to the attention of the owner prior to relining). There shall be no pits, pinholes, cracks or crazing, lifts, dry spots or delamination. The surface shall be smooth and free of waviness throughout the pipe.

Any defects or unacceptable liner determined by the television inspection, test reports for structural values or thickness that will affect the structural integrity of the reconstructed pipe shall be repaired or the Liner replaced at the Contractor's expense. The methods and materials used for the repair or replacement of the failed liner shall be reviewed by the Director of Public Works.

## 2. WRINKLES

Wrinkles in the finished liner pipe that are larger than 5 percent of the pipe diameter are unacceptable and shall be removed and repaired by the Contractor at the Contractor's expense.

## 3. ANNULAR VOID

It is the City's responsibility to demonstrate that a void between the liner pipe and the host pipe wall exists. If so shown, the Contractor shall either devise a method to grout the void to the satisfaction of the Engineer of repair or replace that section of pipe at the Contractor's expense. Methods of repair shall be proposed by the Contractor and submitted to the Engineer for review. The City may demonstrate the existence of the void by dye water flooding of the upstream manhole and viewing the downstream pipe annular space for tracking. Annular voids shall be considered nonconforming work.

4. CIPP samples shall be prepared and tested in accordance with ASTM F1216, Section 8.1 using either method proposed.
5. Visual inspection of the CIPP shall be in accordance with ASTM F1216, Section 8.4.

## 6. THIRD PARTY TESTING

All material testing referred to in this contract specification shall be done by an accredited Third Party testing laboratories. The Contractor shall inform the Engineer at the preconstruction meeting of the laboratory that the Contractor intends to use for the tests. All costs for the testing shall be included in the contract unit prices for the relining work.

## 7. DIGITAL MEDIA AND WRITTEN REPORTS

The Contractor shall perform pre-installation and post-installation inspections of the pipeline by means of remote controlled closed circuit television in accordance with Section 614 of these City Specs. These inspections shall be recorded on an external USB hard drive. The Contractor shall document these inspections in writing and submit all written reports and video to the Engineer. This work shall be considered incidental to any lining or grouting, except where called out as a separate bid item in the contract documents.

Pre-installation inspection of any pipe run shall be performed not more than 3 calendar days before the start of the lining of that pipe run. If the pre-installation inspection reveals any deficiencies in the cleaning or removal of obstructions, the deficiencies shall be corrected and the pre-installation inspection shall be performed again at no additional cost to the City.

**The Contractor shall also submit a written report of the sanitary sewer cleaning. This report shall identify the sewer segments cleaned and the type and volume of debris removed from those sanitary sewers.**

## 8. CIPP LATERAL ACCEPTANCE

All CIPP shall be continuous in length and wall thickness shall be uniform. Installed thickness of the CIPP lateral liner shall be within minus 10 percent and plus 15 percent of the design. The Contractor shall take into account any necessary allowance for longitudinal and circumferential expansion when sizing and installing the liner. The contact tolerance is 1.0 mm. Where any space or gap between the outside surface of the liner and the inside surface of the existing pipe exceeds 1.0 mm, the liner fit will be deemed deficient and corrective action will be required.

Where irregularities of the existing pipe exists such as offset joints, protrusions, bumps, and deformations, and the irregularities remain after the sewer has been prepared in accordance with the Contract Documents, exception to the contact tolerance will be allowed in the irregularity zone at the discretion of the Engineer. The exception shall not present an obstruction to sewage flow.

Acceptance of the CIPP lateral liner will be based on the Engineer's evaluation of the resin impregnation quality control reports, CIPP temperature curing logs, and post construction inspection video, which shall demonstrate:

- a. Observed infiltration of the liner is zero
- b. All active service connections are open, clear and watertight.
- c. There is no evidence of excessive wrinkles, cracks, lifts, scalds, blisters, or delamination in the CIPP.

If any defective CIPP is discovered after it has been installed, it shall be removed and replaced with either a sound liner or a new lateral at no additional cost to the City. Obtain approval of the Engineer for method of repair, which may require field or workshop demonstration.

#### P. CLEANUP

After the installation work has been completed and all testing acceptable, the Contractor shall clean up the entire project area and return the ground cover to grade. All excess material and debris not incorporated into the permanent installation shall be disposed of by the Contractor. Sidewalk, driveway, street surfaces and lawn areas shall be restored to its preconstruction condition at the Contractor's expense.

### 615.2.1 – LATERAL LINING SYSTEM

#### A. GENERAL

These specifications include the minimum requirements for the rehabilitation of lateral connections and their interface with the mainline pipes via CIPP, as shown on the plans and included in the contract documents. The length and type of CIPP installed shall be as specified in the contract documents or as directed by the Engineer.

Lateral CIPP shall be installed from the mainline pipe and extending to the specified length as shown or stated in the contract documents, or as directed by the Engineer. Cleanouts are required where shown on the plans. The installed lateral CIPP system shall be free of all defects that will affect the design, service life, and operation of the lateral interface with the mainline sewer and the specified length of the lateral pipe.

The liner may be inverted or pulled into place from the mainline sewer.

The installed system shall eliminate water leakage into the sewer system over the entire rehabilitated length of sewer.

The prices submitted by the Contractor shall include all costs for the various bid items necessary for furnishing and installing, complete and in place, the system in accordance with these specifications, except as otherwise directed by the Engineer.

The furnished and installed system shall include all materials, manufacturer's recommended equipment, and manufacturer's installation procedures.

The installed system shall be free of all defects that will affect the design, service life, and operation of the lateral and applicable portion of the mainline. The installed system shall eliminate infiltration and exfiltration over the entire length of the system.

The system shall be designed against corrosion and typical chemicals found in domestic sewage or as directed by the Engineer. The manufacturer of the system shall provide testing data that supports the chemical resistance in accordance with ASTM F1216.

The mainline and lateral portion of the system shall be designed to support groundwater loads and structurally replace the host pipe completely. Wall thickness design calculations stamped by a registered professional engineer shall be included with the Contractor's submittals. All design must be supported by third party testing and documentation for the exact product being submitted.

All materials furnished as part of this contract shall be marked with detailed product information, which shall be made available to the Engineer at their request, including any Manufacturer's testing data.

See Section 615.1 of these City Specs for requirements of bypass pumping and other general construction requirements.

## B. SUBMITTALS

Product data submittals required for all rehabilitation lateral lining systems proposed for installation under this contract shall include:

- System material type and manufacturer to be used, including catalog data sheets, ASTM references, material composition, manufacturer's recommended specifications, component physical properties, and chemical resistance.
- Manufacturer's detail description of the recommended procedures for handling and storing materials.
- All quality assurance documentation and test reports for the system materials, and testing results of the physical properties, corrosion resistance, and sealing method.
- CIPP wall thickness design calculations based on ASTM F1216, stamped by a registered professional engineer.
- Wetout/cure logs per liner providing details pertaining to the resin type and quantity, catalyst type and quantity, tube type, installation pressures, temperatures and times (as applicable to the curing lateral lining system utilized).
- Qualifications of the Contractor installing the system.

## C. QUALITY CONTROL PLAN

A detailed quality control plan (QCP) shall be submitted to the Engineer that fully represents and conforms to these specifications. At a minimum, the QCP shall include the following:

- How the system is prepared for installation
- How the system is installed
- How the completed system is confirmed to be in compliance with the requirements of the contract documents
- Training/Qualifications of personnel preparing and installing the system

Proposed procedures for quality control, product sampling, and testing shall be defined. Proposed methods and procedures for system repair and replacement in the events of product defects or failure shall also be included.

The Contractor shall not receive any additional compensation for the repair or replacement of a system deemed non-conforming to these contract documents by the Engineer.

## D. SAFETY

The Contractor shall conform to all work safety requirements of pertinent regulatory agencies, and shall secure the site for working conditions in compliance with those requirements, including confined space entry. This includes the posting of such signs and/or other devices as are necessary for the safety of the work site for both the Contractor and the Public.

## E. WARRANTY

All lateral lining work shall be guaranteed for a period of 3 years from the date of substantial completion granted in writing by the Engineer unless otherwise stipulated in writing by the City. During this period, the Engineer reserves the right to inspect and/or test, at their own expense, any and all work performed as part of this contract. Any actionable defects documented during this period by the Engineer shall be repaired or replaced by the Contractor at no additional cost to the City. The Engineer shall have until the end of the warranty period to report the findings of their inspection(s) and/or testing to the Contractor, and the Engineer shall negotiate a reasonable repair schedule for any actionable items found. The warranty shall cover lining repair due to hydrostatic leaks (infiltration) as defined per NASSCO PACP infiltration definitions, and any other work directed by the Engineer to make the finished product meet these specification requirements.



## F. MATERIALS

### 1. GENERAL

“Top-Hat” style liner systems shall NOT be allowed under these specifications without the express written permission of the Engineer.

The system seals the point of connection from the mainline pipe to a connecting lateral pipeline and is normally installed without excavation by the installation of resin-impregnated, flexible laminate installed into the existing service lateral, lapping over the mainline pipe, and sealing the connection.

The portion of the system installed over the mainline pipe shall, at a minimum, extend from one end of the wye fitting to the other, and shall encompass the entire cross section of the pipe, from 12 o'clock to 12 o'clock (“full wrap”). For other lateral connection fitting types, including break-ins, the mainline portion of the system shall extend a minimum of 1-foot in each direction, measured from the center of the lateral pipe, and shall also encompass the entire cross section of the mainline pipe from 12 o'clock to 12 o'clock (“full wrap”).

The distance the lateral system extends up the lateral shall be as noted in the contract documents or as directed by the Engineer. The system shall extend continuously from the sewer main into the lateral and up the lateral to the designated length. The system shall be capable of sealing lateral connections of various types and angles. The resin shall be cured to form the tube into a hard, impermeable pipe-within-a-pipe.

When cured, the system shall seal the connection of the lateral to the mainline in a continuous, tight fitting, watertight pipe-within-a-pipe to eliminate any visible leakage between the lateral and mainline, and shall provide a leak-proof seal to prevent root intrusion, infiltration, and exfiltration between the liner and host pipe.

Systems that use polyester and vinylester resins shall include a method of sealing the connection and the end of the lateral liner as recommended by the manufacturer of the system. The product used in the sealing method shall be installed in accordance with manufacturer's recommendations.

Systems that use silicate or epoxy shall prepare the host pipe in accordance with the manufacturer's recommendations. Third party testing data shall be provided to prove the bond strength between the resin and surface to which it is to bond.

The installation of the system will require the product to be capable of being installed without access to the upstream side of the lateral pipe, and capable of navigating bends or other transitions in the lateral.

## 2. REFERENCES

ASTM F1216 – Standard practice for rehabilitation of existing pipelines and conduits by the inversion and curing of a resin-impregnated tube.

ASTM F1743 – Standard practice for rehabilitation of existing pipelines and conduits by pulled-in-place installation of cured in place thermosetting resin pipe.

ASTM D543 – Practices for evaluating the resistance of plastics to chemical reagents.

ASTM D790 – Test methods for flexural properties of unreinforced and reinforced plastics and electrical insulating materials.

ASTM D5813 – Specification for cured in place thermosetting resin sewer piping systems

ASTM F2019 – Standard practice for rehabilitation of existing pipelines and conduits by the pulled in place installation of glass reinforced plastic (GRP) cured in place thermosetting resin pipe.

NASSCO Guideline Specification for the installation of cured in place pipe (June 2011)

NASSCO Guideline Specifications for cleaning and televising pipelines

## 3. MATERIAL TYPES

### a. Non-Woven Fabric Tube

The fabric tube shall consist of one or more layers of absorbent non-woven felt fabric, felt/fiberglass or fiberglass and meet the requirements of ASTM F1216, ASTM F1743, ASTM D5813, and ASTM F2019. The fabric tube shall be capable of absorbing and curing temperatures and have sufficient strength to bridge missing pipe segments, and stretch to fit irregular pipe sections.

The wet-out fabric tube shall have a uniform thickness and excess resin distribution that when compressed at installation pressures will meet or exceed the design thickness after cure.

The fabric tube shall be manufactured to a size that when installed will tightly fit the internal circumference, meeting applicable ASTM standards or better, of the original pipe or the existing lined pipe. Allowance shall be made for circumferential stretching during installation. The tube shall be properly sized to the diameter of the existing pipe and the length to be rehabilitated and be able to stretch to fit irregular pipe sections and negotiate bends. The Contractor shall determine the minimum tube length necessary to effectively span the designated run. The Contractor shall verify the lengths in the field prior to ordering and prior to impregnation of the tube with resin, to ensure that the tube will have sufficient length to extend the entire length of the run. The contractor shall also measure the inside diameter of the existing pipelines in the field prior to ordering liner so the liner can be installed in a tight-fitted condition.

The outside and/or inside layer of the fabric tube (before installation) shall be coated with an impermeable, flexible membrane that will contain the resin and facilitate vacuum impregnation and monitoring of the resin saturation during the resin impregnation (wetout) procedure.

No material shall be included in the fabric tube that may cause delamination in the cured CIPP. No dry or unsaturated layers shall be acceptable up on visual inspection as evident by color contrast between the tube fabric and the activated resin containing a colorant.

The wall color of the interior pipe surface CIPP after installation shall be a light reflective color so that a clear, detailed examination with closed circuit television inspection equipment may be made. The hue of the color shall be dark enough to distinguish a contrast between the fully resin saturated felt fabric and dry or resin lean areas.

Seams in the fabric tube, if applicable, shall meet the requirements of ASTM D5813 H.

The outside of the fabric tube shall be marked with the name of the manufacturer of the CIPP lateral lining system, manufacturing lot and/or production footage, as applicable. The print must be visible during final CCTV inspection.

The minimum length of the fabric tube shall be that deemed necessary by the installer to effectively span the distance specified in the contract documents or as directed by the Engineer.

The nominal fabric tube wall thickness shall be of a dimension to provide a watertight CIPP and a complete structural replacement for the host pipe, without causing an unreasonable reduction in cross section size.

The liner shall be constructed with transitions where applicable.

b. Resin

The resin shall be corrosion resistant polyester, vinylester, silicate, or epoxy resin and catalyst system and hardener system that, when properly cured within the tube composite, meets the requirements of ASTM F1216, ASTM F1743 or F2019, the physical properties herein, and those, which are to be utilized in the design of the CIPP for this project. The resin shall produce CIPP which will comply with or exceed the structural and chemical resistance requirements of these specifications.

The method of cure may either be from a manufacturer recommended heat source or UV light cure. Method of cure instructions along with a cure log shall be on site at all times.

The resin to tube ratio, by volume, shall be furnished as recommended by the manufacturer.

c. Structural Requirements

The physical properties and characteristics of the finished liner will vary considerably, depending on the types of resin and tube used. It shall be the responsibility of the Contractor to provide a CIPP lateral lining system which meets or exceeds the minimum properties specified herein.

The CIPP shall be designed per ASTM F1216. The CIPP design shall assume no bonding to the original pipe wall

The lateral CIPP shall be designed assuming the following minimum design data, unless otherwise directed by the Engineer:

- Factor of Safety = 2
- Soil Modulus = 1,000 psi
- Soil Density = 120 pcf
- Live Load = H20
- Depth of Cover = as specified
- Groundwater = ½ depth of cover
- Ovality = 2%

The designer of the CIPP system shall set the long term (50 year extrapolated) Creep Retention Factor at 50% of the initial design flexural modulus as determined by ASTM D-790 test method. This value shall be used unless the Contractor submits long term test data (ASTM D 2990) to substantiate a different retention factor.

The CIPP shall, at a minimum, meet or exceed the structural properties, as listed below:

- Flexural modulus of elasticity: 250,000 psi
- Flexural strength: 4,500 psi

The structural performance of the finished pipe shall be adequate to accommodate all anticipated loads throughout its design life. No CIPP rehabilitation technology will be allowed that requires bonding to the existing pipe for any part of its structural strength.

## G. EXECUTION OF LATERAL SEALS

### 1. GENERAL

Lateral seals shall be installed from the mainline sewer with the lateral CIPP portion that extends up the lateral at the distance specified in the contract documents or as directed by the Engineer. If a clean out is required for installation, the type and location shall be as directed by the Engineer.

### 2. PREPARATION

Preparation, cleaning, inspection, sewage bypassing, and public notification shall be the responsibility of the Contractor. The Contractor shall clean the interior of the existing host pipe prior to installation of the system. All debris and obstructions that will affect the installation and the final product shall be removed and disposed of off site. All preparation shall be in accordance with the manufacturer's written installation procedures.

The system shall be constructed of materials and methods that, when installed, shall provide a jointless and continuous, structurally sound CIPP able to withstand all imposed static and dynamic loads on a long term basis.

The Contractor shall only use existing manholes as access points unless given the express written permission of the Engineer, or as shown on the plans.

#### a. Pre-Cleaning CCTV

If a cross-bore is found, the Contractor shall, at their own expense, request utility locating to identify the cross-bore. Prior to cleaning, the Contractor shall, to all extents possible, televise the service lateral to confirm that cleaning the lateral will not damage or breach a conflicting utility bored through the sewer lateral.

b. Cleaning of Pipe Lines

The Contractor shall remove all internal debris from the pipe line that will interfere with the installation and the final product delivery of the system as required in these specifications. The Contractor shall make use of commercially available industry standard cleaning equipment to prepare the pipe for system installation. Solid debris and deposits shall be removed from the pipeline, if possible, and disposed of properly by the Contractor, in accordance with all federal, state, and local laws. Precaution shall be taken by the Contractor in the use of cleaning equipment to avoid damage to the existing pipe. If the pipe cannot be cleaned sufficiently using industry standard cleaning equipment, the Contractor shall not continue cleaning efforts without the express written permission of the Engineer.

c. Post-Cleaning CCTV

Contractor shall perform post-cleaning video inspections of the pipe(s). Only PACP certified personnel trained in locating breaks, obstacles, and service connections by CCTV shall perform the inspection. The Contractor shall provide the Engineer a copy of the pre- and post-cleaning video and reports as part of the project deliverables.

d. Existing Sewage Flows

If ordinary bypass operations will not suffice for installation, the Contractor, at their own expense, shall contact and work with the property owner and/or upstream property owner(s) to create a plan for reducing water/wastewater use in order to allow for successful installation. Interruptions to flow shall be coordinated with the property owner(s) no fewer than 7 calendar days in advance, and the Contractor shall notify the Engineer of all such plans immediately.

e. Bypass Existing Sewage Flows

The Contractor shall, at their own expense, be responsible for the creation, execution, and management of a bypass plan to allow for proper and successful installation of the lateral CIPP system. See Section 615.1 of these City Specs for further bypassing requirements.

f. Line Obstructions

Contractor, at their own expense, shall be responsible for clearing the line(s) of obstructions which will interfere with the installation and long-term performance of the CIPP system. If pre-installation inspection reveals defects which will not allow for proper CIPP installation and which cannot be rectified with trenchless means, the Contractor shall immediately notify the Engineer of the issues. The Contractor shall NOT perform any open-cut repairs without the express written permission of the Engineer.

g. Locating

The Contractor shall be responsible for confirming the locations of all branch service connections prior to installing and curing the CIPP. Each connection shall be dye tested at the Contractor's expense to determine whether the connection(s) is active or abandoned. Abandoned connections shall be lined through and not reinstated. In the event the status of a service connection cannot be adequately verified through dye testing or televising, the connection shall be reinstated unless otherwise directed in writing by the Engineer.

3. INSTALLATION

The entire liner shall be wetout using vacuum impregnation, including the lateral and mainline portions. A roller table shall also be used for the installation process.

The System shall be loaded inside and/or on a pressure apparatus. The pressure apparatus, attached to a robotic device, shall be positioned in the mainline pipe at the service connection. The robotic device, together with a CCTV camera, shall be used to align the lateral portion of the system with the service connection opening. Air pressure, supplied to the pressure apparatus through an air hose, shall be used to invert or expand the resin impregnated CIPP into the lateral pipe, and push the mainline portion of the system against the mainline pipe. The pressure shall be adjusted to the manufacturer's recommended installation pressure to fully install the CIPP into the lateral pipe and hold the system tight to the pipe walls. Care shall be taken during the curing process not to over-stress the tube.

After lateral CIPP installation is completed, the manufacturer's recommended pressure is maintained on the impregnated CIPP for the duration of the curing process. Curing method shall be compatible with the resin selected and shall be in accordance with the manufacturer's recommendations. The initial cure shall be deemed complete when the CIPP has been exposed to the cure source for the time period specified by the manufacturer.

The Contractor shall cool (as applicable) the hardened CIPP before relieving the pressure in the apparatus. Cool-down may be accomplished by the introduction of cool air into the pressure apparatus. Care shall be taken to maintain proper pressure throughout the cure and cool-down period.

If cured by the ambient-cure process, the Contractor shall maintain bladder pressure until the CIPP has completely cured per the manufacturer's recommendations before relieving the pressure in the pressure apparatus.

The finished CIPP shall be free of dry spots, lifts, and de-lamination. The system shall not inhibit the CCTV post lining video inspection of the mainline or service lateral pipes. Frayed ends of the system shall be removed prior to acceptance.

The Contractor shall maintain a visible, written log of all activities in accordance with manufacturer's recommendations, and shall include time/location of wetout, time of insertion, time/location of lateral insertion, bladder pressure requirements, required cure time, actual cure time, and cool down duration.

After the work is complete the Contractor shall provide the Engineer with videos and reports showing pre- and post-lining inspections.

#### 4. FINISH

The installed system shall be continuous over the specified length of the sewer line section (including mainline and lateral), and be free from visual defects such as foreign inclusions, dry spots, pinholes, major wrinkles, and de-lamination. The system shall be impervious and free of any leakage from the pipe to the surrounding ground or from the ground to inside the lined pipe.

Any defect, which will or could affect the structural integrity or strength of the system or allow leaks, shall be repaired by the Contractor at their expense.

The system shall provide a watertight seal at the connection to the mainline pipe and for the length of the lateral which was CIPP lined. The following methods are recommended for ensuring a watertight seal:

- 100% Solids Epoxy providing an adhesive bond between the system and the host pipe, installed/applied per the manufacturer's recommendations
- Hydrophilic materials installed/applied per the manufacturer's recommendations



Branch lateral connections or any other pre-existing connection to the service lateral shall be reinstated by a remote controlled robotic cutting device, either from within the pipeline or externally through a cleanout (where applicable). The reinstated connection shall be brushed to allow for a smooth edge.

The Engineer reserves the right to request CIPP samples for third party materials testing of the physical properties, through the entire duration of the warranty period. Samples shall be furnished at the Contractor's expense, and testing shall be carried out at the Engineer's expense.

## **SECTION 616**

### **Manhole and Catch Basin Grade Adjusting Ring Specification**

#### **PART 1 GENERAL**

##### **1.01 SCOPE**

This specification defines the materials required for the adjustment of all manholes, catch basins or other underground utility structures to final elevation as shown on the project drawings.

##### **1.02 WORK REQUIRED**

- A. Grade adjustment rings meeting the requirements of this section shall be used to adjust and support the frame and cover or grate to the specified final elevation on all manholes, catch basin or other utility structures.

##### **1.03 SYSTEM DESCRIPTION**

- A. Design Requirements – The grade adjustment rings shall be designed to allow final adjustment of the frame and cover or grate to the grade established by the ENGINEER on the project drawings. The rings shall also be designed to accommodate flat or sloping surfaces to within approximately ¼" (one quarter inch) to ½" (one half inch) of the specified final elevation. The grade adjustment system shall have a minimum 50 (fifty) year design life.
- B. Performance Requirements – The grade adjustment rings shall be capable of supporting the minimum requirements of AASHTO M-306, H-25 and HS-25, be UV stable and be resistant to chemicals and corrosion commonly associated with the sanitary and storm sewer environments.

##### **1.04 SUBMITTALS**

- A. Test Report – A test report from an approved third party testing agency showing the grade adjustment rings meets the minimum requirements of AASHTO M-306, H-25 and HS-25.
- B. Certification – The manufacturer of the grade adjustment rings shall provide certification to the ENGINEER stating that the product meets the design life and material requirements of this specification.

#### **PART 2 PRODUCTS**

##### **2.01 MANHOLE AND CATCH BASIN GRADE ADJUSTMENT RING**

Manhole and catch basin grade adjustment rings shall consist of a variety of heights (thicknesses), diameters and shapes all conforming to the following requirements:

- A. Grade Adjustment Rings – The grade adjustment rings shall be manufactured from ARPRO® Expanded Polypropylene (EPP), black. 5000 series meeting ASTM D3575 and ASTM D4819-13; B6D7G4L3M<sub>2</sub>4S2T<sub>1</sub>7W7. The rings shall be manufactured using a high compression molding process to produce a finished density of 120 g/l ((7.5 pcf).

- B. "Grade" adjustment rings may contain either an upper and lower keyway (tongue and groove) for vertical alignment and/or an adhesive trench on the underside with a flat top.
- C. "Finish" or "Flat" rings may either have a keyway (groove) on the underside for vertical alignment and/or an adhesive trench with a flat upper surface. These rings shall be available in heights (thicknesses) which will allow final adjustment of the frame and cover or grate to within ¼" (one quarter inch) to ½" (one half inch) of the specified final elevation.

"Finish" rings may also have a keyway on the upper surface of the inner diameter to facilitate installation of an "Angle" ring.

- D. "Angle" rings may either have an upper and lower keyway (tongue and groove) for vertical alignment and/or an adhesive trench on the underside. When required, the "Angle" ring or rings shall allow final adjustment of the frame and cover or grate to within ¼" (one quarter inch) to ½" (one half inch) of the specified final elevation.

E. Acceptable Manufacturer – PRO-RING™ by Cretex Specialty Products

## **2.02 EQUIPMENT**

The contractor shall have the required tools and equipment necessary to facilitate proper installation of the grade adjustment rings.

## **2.03 ADHESIVE/SEALANT**

- A. Any adhesive or sealant used for watertight installation of the manhole grade adjustment rings shall be M-1 Structural Adhesive/Sealant or equal meeting the following specifications:

ASTM C-920, Type S, Grade NS, Class 25, Uses NT, T, M, G, A and O

Federal Specification TT-S-00230-C Type II, Class A

Corps of Engineers CRD-C-541, Type II, Class A

Canadian Standards Board CAN 19, 13-M82

AAMA 802.3-08 Type II, AAMA 803.3-08 Type I and AAMA 805.2-08 Group C

- B. Other adhesives or sealants may only be used with engineer or owner's written authorization.

## **2.04 REPAIR MORTAR**

- A. Repair mortar shall be a one component, quick set, high strength, non-shrink; polymer modified cementitious patching mortar, which has been formulated for vertical or overhead use meeting the requirements of ASTM C-109 for Compressive Strength, C-348 and C-78 for Flexural Strength and C-882 for Slant Shear Bond Strength. Repair mortar shall not contain any chlorides, gypsums, plasters, iron particles, aluminum powder or gas-forming agents nor shall it promote the corrosion of any steel that it may come in contact with.

- B. Acceptable Manufacturers

1. Octocrete by IPA Systems
2. Pre-Approved Equal

## **2.05 CEMENTITIOUS GROUT**

- A. Cementitious grout shall be a premixed, non-metallic, high strength, non-shrink grout which meets the requirements of ASTM C-191 and C-827 as well as CRD-C-588 and C-621. When mixed to a mortar or "plastic" consistency, it shall have minimum one day and 28 day compressive strength of 6,000 and 9,000 psi, respectively.
- B. Acceptable Manufacturers
  1. PennGrout by IPA Systems
  2. Pre-Approved Equal

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Installation and surface preparation shall be in accordance with the manufacturer's instructions.
- B. The joint between the first grade ring and top of the manhole, catch basin or utility structure shall be sealed using an adhesive/sealant meeting the requirements of Section 2.03.
- C. If the top of the manhole, catch basin or utility structure is not level or is irregular, then a non-shrink repair mortar meeting the requirements of Section 2.04 or non-shrink cementitious grout meeting the requirements of Section 2.05 shall be used. A bed the specified mortar or grout shall be placed on the top surface of the utility structure and then the first grade ring shall be embedded and leveled into the bed of material.
- D. The remaining joints between all manhole adjustment rings and the frame and cover or grate shall be sealed using an adhesive/sealant meeting the requirements of Section 2.03.
- E. No other materials shall be used in the construction of the grade adjustment area beyond those specified above. Prohibited materials include, but are not limited to wood or wood shims of any kind, concrete, brick, block, stones, etc.
- F. The use of any heat shrinkable chimney seals shall only be permitted with engineer or owner's written authorization.

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## **SECTION 620 – GRADING AND PAVING**

### **SECTION 620.1 – GRADING CONSTRUCTION**

#### **A. GENERAL**

Grading work, when required, is to be performed in accordance with Section 205, 207, and 305 of the State Specs to the depths and thicknesses indicated on the plans. The item of common excavation includes the work of fine grading.

The approaches to the street being graded shall be sloped as indicated on the plan or as directed in the field by the Engineer to reasonably accommodate any equipment or vehicles entering the site. The side slopes shall be graded at a 3-to-1 slope unless otherwise directed.

All sidewalks shall have 4 inches of base aggregate dense unless otherwise noted.

#### **B. MATERIALS**

Dense graded base shall be 1-1/4 inch per section 305.2.1 of the State Specs, constructed to the thickness as shown on the plans or as directed in the field by the Engineer, and constructed in accordance with State Spec 305, except as noted herein, to the compacted thickness shown on the plans or stated in the proposal. All organic material shall be removed from the site of the work and shall not be used as part of the base or subgrade material, and this shall be considered incidental to the work.

The 1-1/4 inch crushed aggregate shall conform to the following gradation requirements:

Sieve Size	Percentage by Weight Passing
1 ¼ inch	95-100
1 inch	—
¾ inch	70-93
⅜ inch	42-80
No. 4	25-63
No. 10	16-48
No. 40	8-28
No. 200	2-12

The stone shall be shaped and thoroughly compacted to the specified thickness to at least 95% of maximum density.

## C. SAWCUTTING

All sawing is considered incidental to the contract unless otherwise noted.

Sawcutting consists of sawing existing concrete or asphaltic pavements, curb and gutter, driveways, or sidewalks, and the washing of the sawing debris at locations where cuts have been made in areas still open to traffic, or as directed by the Engineer. **The saw cuts shall be straight, vertical, and to the full depth of the pavement.** Washing off of the sawing debris shall be required when the pavement being cut will be open to traffic.

For sawing that is not straight or for sawing where the debris is not washed off of pavement that is open to traffic, 5% of the pavement cost may be credited to the project if the Contractor does not re-saw or cleanup as directed. Any re-cuts or extra cleaning shall be at the Contractor's expense.

For trenches, the width of pavement cut shall be sufficiently sized to allow for a minimum of an 8 inch undisturbed ledge on each side, where gravel backfill is used. The contractor may elect to re-saw prior to pavement replacement **at the contractor's own expense**. Curbs and sidewalks shall be completely removed to existing expansion or scored joints sawed full depth, falling within 4 feet of the normal restoration limits, as directed by the Engineer.

## D. EXCAVATION

Surplus excavation must be wasted by the Contractor, at their expense, in locations permitted to such disposal outside the right-of-way (unless otherwise indicated). The estimated quantity for grading is based on information provided by the cross-sections of the roadway and does not include the backfill for utility excavations. **If a Common Excavation item is not included in the contract, backfilling and beveling along replaced pavement, sidewalk, driveway approaches, curb & gutter and other hard surface restoration is considered incidental to the contract.**

Earth in excavation shall be removed to the proper cross section as shown on the plans. The Contractor shall dispose of all excess earth not required in the Contract, and shall also dispose of earth not suitable in the judgment of the Engineer to be used in the work.

Large rocks and other obstructions shall be removed to a depth of not less than 1 foot below subgrade or the existing ground elevation, whichever is lower. The cost of this work is to be included in the bid price for excavation.

### 1. REMOVING EXISTING STRUCTURES

This work shall consist of removing old pavement, curb and gutter, sidewalk, driveways, and other similar structures to the lines as shown on the plans or as directed in the field by the Engineer.



At those locations designated by the Engineer the Contractor shall remove the existing concrete pavement and replace it as directed. Excavation and disposal of excess material to the specified depth of the new pavement is required and will be paid for under the unit bid item for removals, but the removal of temporary pavement shall be considered incidental to the price of placing said pavement.

The edges of existing pavements to remain in place shall be cut as straight lines with vertical faces. The defective pavement shall be removed from an area without damaging the remaining pavement. Damage to pavements due to the Contractor's negligence, as determined by the City, shall be replaced as directed by the Engineer at the expense of the Contractor.

The Contractor may break existing pavements by the use of a drop weight or by a pneumatic pavement breaker if, in the opinion of the Engineer, said uses are unlikely to cause damage to utilities or adjacent property. The Engineer reserves the right to order the Contractor to change the method of pavement breaking during the progress of the work if damages seem likely to occur. In any event, the Contractor shall be solely responsible for all damages.

Service walks, fences, and other structures within the grading limits belonging to abutting property owners shall be removed and delivered to the abutting property when ordered by the Engineer. Any other material not required by the City shall become the property of the Contractor, who shall remove and dispose of such material at **their** own expense.

#### E. EARTH FILL

Earth taken from excavation shall be placed in embankment to the proper cross section as shown on the plans. Such filling shall be placed in layers not to exceed 8 inches in depth and shall be uniformly spread and compacted in such a manner and with such equipment as is deemed acceptable by the Engineer. All sod and other vegetable matter shall be stripped from the ground surface before any filling operations begin. Material used in the preparation of the subgrade shall consist of suitable sand, clay, earth, or gravel, and be free from animal, vegetable, or any other organic matter.

The Contractor shall grade the area around the sidewalk to the proper cross section for topsoil before paving. This work shall be done by hand methods or by use of equipment which, in the opinion of the Engineer, will not cause damage to the curb, walk, or trees. Backfill material placed between the curb and the lot line shall be free from roots, rocks, and construction debris, and shall be subject to the approval of the Engineer.

#### F. SUBGRADE

Before depositing stone, the Contractor shall shape the subgrade and roll it with a power roller weighing not less than 5 tons, or with an approved type of pneumatic-

tired roller, in such a manner that the subgrade will be compacted uniformly over its entire length and width and be at the proper elevation. Areas which are inaccessible to the roller shall be thoroughly compacted with a plate compactor. Use of plate compactors for utility frame adjustments is not permitted. The Contractor shall not do unnecessary hauling upon the finished subgrade. Any ruts or holes that develop during trucking operations in the subgrade or dense graded base shall be re-graded and compacted at the expense of the Contractor.

## G. PROOF ROLL

The Contractor shall attempt to locate any soft or spongy areas in the subgrade using a method approved by the Engineer. Any soft or spongy areas in the subgrade must be removed and replaced with suitable material as directed by the Engineer. The Engineer may also choose to require a proof roll of the dense graded base before paving operations begin.

### 1. UNDERCUTTING

Undercutting of unstable subgrade or base must be authorized by the Engineer. The volume of material removed will be determined either by direct measurement or markings on the subgrade/base measured by the Engineer. The Contractor shall make undercuts approximately 1 foot deep unless instructed otherwise by the Engineer. The aggregate used to fill the undercuts shall be as directed by the Engineer.

## H. PLACING DENSE GRADED BASE

The subgrade shall be checked and approved by the Engineer, crushed dense graded base (gradation 1-1/4 inch) shall be placed and compacted by means a power roller weighing not less than 5 tons, or with an approved type of pneumatic-tired roller, to lifts no thicker than 6 inches until the overall thickness indicated by the plans is reached. Compaction shall be to 95% of maximum density per section 305.3.2 of the State Specs. Soft or yielding spots must be reworked or removed, replaced, and rolled until the dense graded base is uniformly compacted over its entire length and width with no tendency to ravel.

No payment will be made for dense graded base quantities exceeding 125% of the final estimated quantities as computed by the City unless additional earth excavation has been approved by the Engineer. Dense graded base may be incidental to some items in the contract and will not be paid under the Dense Graded Base bid item, if present in the contract.

## 620.2 – CONCRETE CONSTRUCTION

### A. GENERAL

Concrete construction shall conform to Sections 415 and 501 of the State Specs, except the portions which refer to field testing on the construction site, **and except all concrete provided shall be Class A or Grade C concrete with class C fly ash being the only acceptable Supplemental Cementitious Material (SCM).** The Engineer reserves the right to reject any concrete at the Contractor's expense that does not reasonably meet the mix specifications, or is not reasonably workable enough to be properly placed in areas including, but not limited to, corners and angles.

If required by the City, the Contractor shall provide "high-early strength" concrete at the rate listed in the Schedule of Fixed Extras for the specified pavement type unless it is a specific bid item.

During slip-form construction, the Contractor must avoid the hazard of leaving up, overnight, the lines which control the machine sensors ("string line").

The Contractor shall mark the ends of each portion of concrete work with a stamp that shall show "City of Wauwatosa", the year in which the work was placed, and the name of the contracting company that performed the work.

The Contractor will be required to remove all broken concrete, excess dirt, debris, and any other materials resulting from the work and dispose of it with **their** own resources at **the Contractors** own expense.

Tunneling under curbs and sidewalks is optional and at the expense of the Contractor, unless otherwise stated. However, should any subsequent cracking, subsidence, or any other indication of failure occur within the warranty period, the damaged section shall promptly be replaced by the Contractor at no additional cost to the Owner.

The Contractor particularly warrants and agrees, when signing this contract, that **they** will replace, within a year after **final acceptance** of the work under the contract, any pavement, curb, walk, stairs, or driveway that develops pop-outs, scaling, spalling of the surface, structural defects, or any other nonconforming defects as determined by the Engineer.

**Quality Control (QC) field testing referenced in Part 7 of the State Specs for concrete is not required unless otherwise noted within Section 600 or Section 601 of these specifications. Voluntary QC field testing may be done at the Contractor's own discretion and own expense.**

### 1. MATERIALS

The grade and class of all concrete used shall conform to **Grade A or Grade C** of the State Specs (**excluding all SCMs other than class C fly ash**) so a minimum

compressive strength of 3600 pounds per square inch is developed in 28 days of curing. Where the plans call for Special High Early Strength (SHES) Concrete Pavement, the contractor shall conform to the requirements of 416.2.5 of the State Specs. Other grades may be used with the written approval of the Engineer. The use of a water reducing admixture is subject to Section 501 of the State Specs. The Contractor shall provide a list of concrete mix product codes, admixture product information sheets, and their relative WisDOT concrete grades from the concrete supplier.

## 2. ADJUSTING UTILITY FRAMES

Concrete around utility frames or any other fixtures shall not be placed until such frames and fixtures have been accurately adjusted, properly secured, and set to the required alignment and grade by the Contractor.

For concrete paving, the practice of boxing out covers and then placing adjacent concrete promotes random cracking and will NOT be permitted. Whenever possible, the frames may be adjusted and set to grade on a full bed of mortar in advance of the paving operation or curb and gutter placement (except of asphalt pavement and asphalt resurfacing projects where the manhole frames shall only be adjusted after the lower layer(s) of hot mix asphalt pavements is completed). Otherwise frames shall be “wedged” high enough during concrete paving that the aggregates in the agitated concrete mix can move freely under the frame, and thus allow the frame to sit on solid concrete.

If the condition of the structure to be adjusted requires masonry repairs beyond 6 inches of vertical feet from the bottom of the frame, the additional repairs beyond this limit shall be paid per the relevant bid item, or if no bid item exists the Fixed Extra rate.

## 3. TIME OF HAULING READY MIXED CONCRETE

Concrete shall be discharged at the work site within 1-1/2 hours after the cement has been added to the water and/or the aggregates, except for high-early strength concrete mixes which shall be discharged within 45 minutes of water added to cement and SHES concrete shall be discharged per the requirements in 416.2.5 of the State Specs. The Engineer, at their discretion, may still choose to reject loads at the Contractor’s expense if the discharged concrete does not appear to reasonably meet the mix specifications, regardless of whether the allotted discharge time for that mix type has passed.

## 4. CURING COMPOUNDS

Liquid Membrane-Forming Curing Compounds shall conform to the requirements of Section 415.2.4 of the State Specs. Curing compounds shall be used on all concrete surface courses such as, but not limited to pavement, curbs and gutter, walks, and drives.

## B. FORMS

Forms shall be used when concrete is not being poured against existing pavement. The construction of sidewalks without forms is prohibited. **The side pitch of sidewalks shall be ¼ inch per foot and shall slope toward the street unless otherwise noted or shown in the plans.**

The forms shall be clean, straight, of sufficient strength to resist springing out of shape, and an approved type of metal or wood extending the full depth of the concrete, and shall be equipped with fastening devices to prevent movement in any direction. **All foreign material shall be removed from forms that have been previously used.** Flexible forms of an approved type shall be used for all inside radii under 200 feet. Flexible face/outside forms shall be used on radii of less than 300 feet. When flange forms without a bar recess are used, the Contractor shall provide a metal parting strip for the reinforcing steel so that the steel will be fully exposed when the forms are removed, or drill in the rebar at their own expense when the concrete is hardened.

All rubble, broken concrete, and other debris shall be removed from the area between the curb and lot line before the curb forms are set.

The forms shall be set upon the prepared subgrade to proper line and grade and firmly staked in position. Areas which are inaccessible to a mechanical vibratory roller shall be compacted by using an approved mechanical compactor. Non-mechanical compaction methods will NOT be permitted. Before steel reinforcing or concrete is placed, the contact surfaces of the forms shall be cleaned and oiled.

The Contractor must continually have, in advance of the concrete pour, at least 200 linear feet of form setting, fine grading, and compacting completed for inspection.

For pavement **and sidewalk**, forms and form pins shall not be removed for at least 4 hours after the concrete is finished, unless approved by the Engineer. The removal of forms and form pins shall be at a time and in a manner which will not cause damage to the newly poured concrete.

Where finishing machinery is to ride on the forms, the Contractor shall use an approved type of "Road" form. The foundation under the forms shall be firm and cut true to grade so that the form, when set upon, will be firmly in contact for its whole length and at the desired grade. The material under the forms shall be mechanically tamped so no settlement or springing of forms under the finishing equipment occurs.

**The Contractor shall, at their own expense, repair lighting systems which are damaged by their form pins. Refer to Section 605 of the City Specs for repair requirements.**

## C. JOINTS

The Contractor shall provide whatever assistance is requested by the Engineer to properly locate all joints. The location and spacing of contraction points shall be determined by both the Contractor and the Engineer. In the event that both cannot agree on the location of a joint, the decision of the Engineer shall be utilized.

The depth of joints must be 1/3 the thickness of the pavement. Joints in the curb section must be a minimum of 2 inches deep.

Contraction joints shall be cut in drive approaches as specified and shown on the plans or details, or as directed by the Engineer at a minimum depth of 1-3/4 inches.

The sawing of any contraction or longitudinal joints must be approved by the Engineer. Sawing expansion joints and joints in sidewalks is prohibited.

**Any required tie bars shall be considered incidental to any concrete work**

## 1. PAVEMENT

Transverse joints in concrete pavement are required at 10-15 foot intervals as directed by the Engineer, except as otherwise indicated. The Engineer may require joints to vary to match the center of a driveway, utility cover, or any other structure as they see fit. Curb joints must match pavement joints.

a. CONSTRUCTION JOINTS: Shall be constructed at the formed edges of all pavement slabs. Reinforcing bars, No. 4 bar x 30 inches long deformed bars shall be placed at 30 inch centers midway between the top and bottom of the slab. The ends of the rods shall be bent down or suitable chairs provided so that the main portion of the bar is parallel to the surface of the slab. The reinforcing bars shall be straightened after the forms are removed and before the adjacent slab is poured. Transverse construction joints with pavement thicknesses 8" or greater shall be doweled.

Construction joints shall be provided at the end of each day's pour or at locations where the interval of time between loads of concrete exceeds 1 hour. Construction joints shall be constructed only at regular planned joint locations.

b. CONTRACTION/TRANSVERSE JOINTS: All transverse joints shall be installed at right angles or radial to the centerline of the pavement unless otherwise shown in the plans or directed by the Engineer. Contraction joints shall be provided at approximately 10-15 foot intervals or as directed by the Engineer. The joint spacing and the decision concerning the location of sawed or formed contraction joints shall be entirely at the discretion of the Engineer. Pavement thicknesses 8" thick or greater shall be doweled.

Sawed contraction joints shall be provided to a depth of 1/3<sup>rd</sup> of the pavement thickness by using a blade that cuts approximately 1/8<sup>th</sup> of an inch in width. During the finishing sequence, hand cut joints shall be provided at a minimum of approximately 80 foot intervals. The length of time between the finishing of

the concrete and the sawing of joints shall not exceed 12 hours for transverse joints and 24 hours for longitudinal joints. "Soft-cut" or other methods for the construction of contraction joints shall be subject to the approval of the Engineer prior to their use.

c. LONGITUDINAL JOINTS: Reinforcing bars, No. 4 bars x 30 inches in length, shall be placed at 36 inch centers midway between the top and bottom of the slab during pouring. Longitudinal joints shall be constructed as and in the locations shown on the plans. Joints shall be true to line and perpendicular to the surface of the pavement. Longitudinal joints may consist of construction joints where new work joins work previously completed. All other longitudinal joints shall be constructed by sawing in accordance with the plans, or any method approved by the Engineer.

The equipment used in any sawing of joints shall meet the approval of the Engineer. The sawing shall be done as soon as practicable after the concrete has set sufficiently to preclude raveling during the sawing and before any cracking takes place in the concrete.

d. BASE PATCHING AND CONCRETE REPAIR AND REPLACEMENT: Base Patching Construction shall conform to the State Specs 390.3 for concrete patching and as modified by these specifications. Base patching shall use grade A concrete, grade B concrete is not permitted. A minimum of 6 inches in depth of 1 ¼ inch base aggregate shall be placed prior to pouring the concrete base patch. Base aggregate shall be incidental to the base patching Item(s) unless otherwise noted in the plans.

Base Patching shall be tied with reinforcing bars, No. 6 x 12 inches in length at 30 inch centers midway between the top and bottom of the slab, on all sides to the existing concrete. Transverse joints in base patching for pavement thicknesses 8 inches thick or greater shall be doweled at intermediate joints within the repair area. Required reinforcing bars and dowel bars shall be included within the costs of the Base Patching item(s).

Concrete Pavement Repair and Replacement shall conform to the State Specs 416.3.7 and as modified by these specifications. The existing base shall be removed and new 1 ¼ inch base aggregate a minimum of 6 inches in depth shall be placed unless otherwise noted in the plans or approved by the Engineer. Base aggregate shall be incidental to the Concrete Pavement Repair and Replacement item(s) unless otherwise noted in the plans.

Transverse joints in Concrete Pavement Repair and Replacement for pavement thicknesses 8 inches thick or greater shall be doweled and dowels shall be included in the costs of the Concrete Pavement Repair and Replacement item(s). Reinforcing bars, No. 6 bars x 12 inches in length, shall be placed at 30 inch centers midway between the top and bottom of the slab along longitudinal joints. Required reinforcing bars and dowel bars shall be included within the costs of the Concrete Pavement Repair and Replacement item(s).



## 2. CURB & GUTTER

When concrete curb and gutter abuts new concrete pavement, contraction joints shall be constructed coincident with pavement joints at approximately 10-15 foot intervals or as directed by the Engineer. Contraction joints abutting other pavement types shall be placed at approximately 10 foot intervals or as directed by the Engineer. Joints are required at the beginning and end of each radius. Trim ends of existing curbs to be joined to a vertical plane.

The contraction joint may be formed by placing a steel template 3/16<sup>th</sup> of an inch thick, 2 inches deep and cut to the cross section of curb and gutter, on the back form and flange form. At radii and where the height of the face varies, the Contractor may use 3/16<sup>th</sup> inch thick plates cut to the exact cross section of the full depth of the curb and gutter. In all cases, the finished joint shall be perpendicular or radial to the forms.

Backfilling behind curb and gutter is considered incidental to the work.

- a. TYPE B AGGREGATE SLURRY BACKFILL ALONG CURB FLANGE: When indicated in the plans to slurry backfill along the curb flange, the slurry backfill should conform to Section 6.43.9 of the Standard Specs, *with the addition of one bag of fly ash* per cubic yard. The mix shall be deposited in the trench directly from a concrete transit mix truck.

## 3. SIDEWALK

Joints shall be cut a minimum of 1-3/4 inches deep. Joints for sidewalks shall be cut at approximately 5 foot intervals unless directed otherwise by the Engineer.

## 4. EXPANSION JOINTS

Expansion joints of 1/2 inch thick material, i.e. "felt", shall be used at any location where sidewalks abut other buildings or pavements, e.g. driveways and curb heads, or any other location as directed by the Engineer. They shall also be placed approximately every 100 feet or as directed by the Engineer when pouring continuous, new sidewalk. Expansion joints in curbs shall conform to 601.3.6 of the State Specs. Unless otherwise directed by the Engineer, place expansion joints at 3 feet on either side of an inlet frame. The Engineer may further decide to have expansion joints placed at any spot and in any thickness where they see fit, and **at all locations the expansion material must be to the full depth of the cross section.**

Expansion joints are also required around any hydrant, power pole, light pole base, or structure next to which concrete is being poured, and at any other location as directed by the Engineer. Felted isolation box outs around applicable items above shall be 30" x 30" unless otherwise shown in the plans or directed by the engineer.

- a. MATERIAL: Joint material shall conform to 415.2.3 of the State Specs.



## 5. JOINT SEALING

- a. GENERAL: All joint sealers shall conform to current Wisconsin D.O.T. practice. Joint Sealing shall consist of cleaning the joint in preparation for sealing and sealing all contraction and expansion joints in the concrete pavement with a hot applied joint sealing material. The work shall conform to the plan details and as follows.
- b. MATERIALS: All joints shall be sealed with a hot applied joint sealant conforming to the Specification for Joint and Crack Sealants, Hot-Applied, for Concrete and Asphalt Pavements, ASTM Designation D6690, type II. A Certification of Compliance shall be furnished to the Engineer prior to application.

CONSTRUCTION: Joints shall not be sealed until they have been inspected and approved by the Engineer. All contraction and expansion joints in concrete pavement shall be sealed with a hot-poured sealer. All sawed longitudinal joints shall be sealed with a hot-poured sealer.

The operation of sealing shall be performed as soon as practicable upon elapse of the curing period and, in any event, prior to the time traffic of any kind uses the pavement **unless otherwise approved by the Engineer**. Application of the joint sealer shall be made when the joint surfaces are clean and dry.

1. Immediately before sealing the joint, thoroughly clean the joints of all laitance, curing compound, and other foreign material. Exposed joint faces shall be cleaned by sandblasting or water blasting with sufficient pressure to thoroughly and completely clean the joint. A multiple-pass technique shall be used until the surfaces are free of material that might prevent bonding. For the final cleaning immediately prior to installation of the sealer, the joints shall be blown clean with oil-free compressed air. The joint faces must be surface dry when sealant is applied.
2. The sealing compound shall be heated to the pouring temperature recommended by the manufacturer in an approved kettle or tank, constructed as a double boiler, with the space between the inner and outer shells filled with oil or other satisfactory heat transfer medium. The heating kettle shall be equipped with a mechanical agitator, positive temperature control, and an approved dial thermometer for checking temperatures of the compound. The heating kettle, if and when operated on concrete, shall be properly insulated against the radiation of heat to the concrete surface.
3. The sealing compound shall NOT be heated above the maximum safe heating temperature **as specified by the manufacturer**. Any material heated above the maximum safe heating temperature shall be discarded.

4. Pouring of joints shall be made when the sealing material is at the required temperature and, insofar as practicable, the sealing compound shall be maintained at a uniform temperature during pouring operations. Pouring shall not be permitted when the temperature of the sealing compound in the applicator, as it is applied to the joint, is more than 10° F below the recommended pouring temperature. Pouring of the molten sealer in the joint opening shall be done with such equipment that the sealer completely fills the joint opening **without overflowing on the adjoining surface and when finished** and, after shrinkage, the sealer is approximately flush with the adjoining surfaces. In the event satisfactory sealing of a joint is not accomplished in a single pouring, the sealing compound shall be placed in two pourings. At least one-half of the required amount shall be placed in the first pouring, and the second pouring shall follow the first as soon as practicable after the first pouring has attained maximum shrinkage, but not later than one hour after the first pouring.

#### D. CURB & GUTTER

Curb & gutter construction shall conform to Section 601 of the State Specs. The surface of curb and gutter construction shall be finished by troweling and brushing

All curb heads must be 7 inches thick and 6 inches high (to the gutter line), with a 24 inch wide gutter and 1-1/4 inches in the pan, **unless otherwise shown in the plan**. Refer to the "Concrete Curb and Gutter Detail" in the plans for more information.

**One (1) inch expansion material shall be installed at 3' from the edges of inlets and catch basin castings.** When abutting asphalt pavements, curb joints shall be 10-12 foot intervals, except as specifically noted in the plans and special provisions, or as directed by the Engineer. **One (1) inch expansion material is required at the end of all radius points at intersections or sharp curves in the street and at a maximum interval of 300'.**

Honeycombing occurring along the back of the curb and the flange face shall be pointed with mortar (1 part Portland Cement to three parts Fine Aggregate) after removal of the forms. All excess concrete behind the curb shall be removed before backfilling.

##### 1. REINFORCING BARS

The curb and gutter section shall be tied to the **concrete pavement or concrete base** by reinforcing tie bars, with spacing no greater than 36 inches on center. Curbs shall be tied in at the pan only – no rebar shall be installed in the curb head. Parting strips shall be used when practicable or as directed by the Engineer. The Contractor may elect, at their own expense, to drill in tie bars after the concrete has hardened. The cost of reinforcement shall be included in the price for curb and gutter. **Tie bars between existing and proposed curbs shall be in the flange/gutter only and NOT in the curb head.**

## 2. CURB & GUTTER MACHINE

The Contractor may, with prior approval of the Engineer, elect to use a machine for placing, forming, and consolidating the curb and gutter. The machine must be of the tracked vehicular type rather than rubber tired. If a machine is used, extreme care shall be taken when inserting the steel tie bars required in the flange (only for areas where the flange abuts concrete pavement). Any deformations shall immediately be repaired to the satisfaction of the Engineer or the use of such machine shall be discontinued. The resulting curb and gutter shall be of such quality as to equal or exceed that produced by hand methods. Final finishing operations shall be the same as that for hand poured curb.

Before pouring the curb with the slip form machine, the following should be checked by the Contractor: the tracing area shall be uniformly graded so as not of produce undue stress on the self-leveling mechanisms, the machine must have an operational, calibrated variable slope control in order to vary the flange or widening pitch, and **the cross-section of the slip form machine shall be the cross-section called for on the plans**. All vibrators must be operational and the machine must be set at the correct line and grade. Adjustments to slump must be approved by the Engineer who also reserves the right to reject the use of the machine.

Curb and gutter machinery and/or machines which form integral curb and pavement shall not be utilized to construct curbs with a radius of 30 feet or less.

In the event that the Engineer directs the curb and gutter to be constructed integrally with pavement by approved machinery, the Contractor will not be required to install curb and gutter reinforcing bars. No adjustment in the unit price bid will be made for the addition or deletion of curb reinforcement bars.

Supports for the line and grade control line shall have a maximum spacing of 25 feet.

If machine methods are used for forming and finishing curb and gutter, the Contractor may saw contraction joints approximately 1/8<sup>th</sup> inch thick and 2 inches deep, cut to the cross section of the curb. The equipment used in sawing shall meet the approval of the Engineer. The sawing shall be done as soon as practicable after the concrete has set sufficiently to preclude raveling during the sawing and before any cracking takes place in the concrete.

## E. SIDEWALK

Sidewalk construction shall conform to Section 602 of the State Specs. **Sidewalks shall be a minimum of 7 inches thick at alleys and driveways and 5 inches thick at all other locations unless otherwise noted in the plans or directed by the Engineer.**

The cross-slope of the walk shall be ¼ inch per foot (approximately 2%) unless otherwise directed or shown on the plans.

The detectible warning fields used in pedestrian ramps shall be **cast iron of a natural patina** finish unless otherwise directed by the Engineer. Warning fields with coatings of any kind are not allowed unless directed by the Engineer. Installation shall conform to the manufacturer's recommended procedures.

The surface of sidewalk construction shall be finished by troweling and brushing, and sidewalks shall be 5 feet wide unless otherwise noted or directed by the Engineer. The Contractor must provide compacted crushed aggregate when necessary to fill up to subgrade for walk construction. **Compacted crushed aggregate is** to be considered incidental to the work unless otherwise stated as a separate bid item. Expansion joints must be used where sidewalks abut any other pavement or as directed by the Engineer. All joints must be hand cut. Where sidewalk is being installed on a radius of less than 250 feet flexible forms shall be used.

Where non-continuous walk removal and replacement is encountered, the Contractor shall replace the walk sections within 4 business days after removal. In the case of walk abutting commercial properties such as hospitals, churches, businesses, schools, or as directed by the Engineer, the walk shall be replaced within 1 calendar day. Backfilling and cleanup at each work location shall be completed within 5 business days after the finishing operation. Extensions to these deadlines may be made with written approval of the Engineer. Requests to use temporary access must be submitted to and approved in writing by the Engineer. Temporary access shall be at the Contractor's expense unless otherwise explicitly noted in writing by the Engineer.

## **1. TREE ARCS**

Where "half moon" tree arccs are required, roots shall be cut manually, using only hand tools, after the adjacent concrete slabs have been removed. Manual root cutting shall be performed along the line needed to accommodate the flexible form used to construct the tree arc. Non-manual means to cut roots shall not be permitted unless otherwise approved in writing by the Engineer.

Contractor shall make every effort to safeguard and preserve all trees and tree roots not within the limits of root removal specified and/or approved by the Engineer.

## **2. ROOTS OUTSIDE OF TREE ARCS**

Tree roots at sidewalk slabs marked with a "T" not at tree arcs shall be cut by the contractor at six (6) inches outside of the sidewalk area using hand tools, a root cutting machine, or other engineer approved method. Machine root cutting must be completed prior to removing adjacent concrete slabs. Root cutting using hand tools may be done after the adjacent concrete slabs have been removed.

Machine cuts shall be made along the length of the slabs only where slabs are marked for removal with a "T" due to root damage. Root cutting before slab removal is not allowed at any other locations. Cuts shall be made perpendicular to the length of the root and shall be done in a manner so as not to splinter the wood. Cutting depth shall be nine (9) inches from the proposed sidewalk surface.

### 3. BRICK PAVERS

The paving block installation shall be rigid and shall not be displaced even when subjected to heavy loads. Paving Blocks shall be reset to match the existing pattern. They shall be sawcut as required to fit existing conditions and shall tightly abut all existing construction without gaps. Material for setting bed course and the joints between the pavers shall consist of a wet mixture of 1-part Portland cement to 10 parts mason sand. Where Paving Blocks abut existing curb, the finished surface shall be 1/2-inch above the top-of-curb.

Sealant shall be placed at all joints between paver block and water, gas, or other utility boxes. Sealant for joints around utility boxes shall be SikaFlex 1A, as manufactured by Sika Corp, Lyndhurst, NJ, 800-933-7452, or approved equal. Color shall be concrete gray unless otherwise specified or noted in the plans. Seal around all utility boxes with specified material in accordance with manufacturer's requirements.

Where there are existing gaps wider than 1/2 inch between blocks to be removed and reset or replaced, paver blocks shall be cut with a saw to provide the pieces necessary to fill in the gaps.

Bricks that are part of an adjacent driveway, sidewalk, carriage walk, or other feature shall be removed as necessary to complete the scope of work, salvaged and stored in a safe location and reinstalled within 5 days of the sidewalk being replaced even if these bricks are within the right-of-way. Reinstallation of privately owned sidewalk bricks shall match the existing condition of the sidewalk prior to the work taking place. Removal, salvaging, storing and reinstallation of bricks that are part of an adjacent driveway, sidewalk, carriage walk, or other feature shall be considered incidental to the contract.

### 4. CONCRETE STEPS

The existing concrete step shall be completely removed and new step formed and poured. Any sawcutting or concrete walk removal and replacement required behind the joint of the existing step will be paid for separately under the bid item for walk removal and replacement.

The dimensions of the new step shall match the existing one as closely as practicable, however the Engineer may change the final dimensions as they see fit. Any reinforcement for the step(s) required by the Engineer shall be considered incidental to the contract. No additional payments shall be made for any concrete required by a change in dimensions.

## F. DRIVE APPROACHES

The drive approaches and drives shall be constructed so the width at the sidewalk edge is equal to the width of the private portion of the driveway, or as directed by the Engineer. The approaches and flares for approaches shall be placed as directed by the Engineer (typically 3 feet from the start of the flare to the start of the transition), and the transitions in the curb head from the bottom of the driveway to the end of the flare shall be 1 foot unless otherwise directed by the Engineer. The shape shall be as marked by the Engineer.

The Engineer may require moving replacement service walks and adjusting driveways. The Contractor shall leave curb openings for driveway approaches as indicated and as further directed by the Engineer. Approaches shall have expansion joints where they abut other pavements and sidewalk, unless otherwise directed by the Engineer.

All approaches, including at alleys, shall have a minimum of 7 inches of concrete and 6 inches of mechanically compacted crushed recycled aggregate unless otherwise noted or directed by the Engineer.

Backfilling and cleanup at each work location shall be completed within 5 business days after the finishing operation, **unless otherwise approved by the Engineer.**

## G. PLACING CONCRETE

After all the form work has been completed and inspected, and before placing concrete, the forms shall be oiled, checked for correct line and grade, and the compacted base checked for correct elevation. All debris shall be removed from the pouring area. The **compacted base** shall then be sprinkled with sufficient water to thoroughly dampen it.

The concrete shall then be placed in as nearly a continuous operation as possible to the proper height, consolidated, and stuck-off flush with the top of the forms in a manner which the Engineer finds satisfactory. No concrete that has partially hardened or been contaminated by foreign material shall be deposited on the work, nor shall re-tempered concrete be used. The Engineer reserves the right to reject any nonconforming concrete at any time.

## H. FINISHING

**A metal, non-aluminum,** straightedge must be used on the gutter lines along driveway openings. The curb and gutter crew must also be provided with templates or "gauges" in order to obtain the proper depth from the top of a back form to the top of the concrete along driveway openings. At said driveway openings, construction procedure must provide a smooth and uniform vertical plane along the back in order to receive the expansion joint material. The height of this back edge

shall be level with the flange edge of the curb unless otherwise directed by the Engineer.

Excessive troweling and watering will not be permitted. Surface applications to hasten hardening are prohibited. Patching will not be permitted except upon approval of the Engineer.

All concrete construction shall have applied approved curing compounds as stated in Section 415.2.4 of the State Specs, forming emulsions or emulsifiable concentrates for curing and protection of concrete surfaces, as soon as practicable after the surface water sheen has disappeared from the fresh concrete. Costs shall be included with the price of the concrete.

The Contractor shall make an impression of an arrowhead in the concrete curb to indicate the location of all new and existing street lighting conduit crossings, which shall be incidental, or they may elect to grind in equivalent arrows after the concrete has hardened. **Marking of all new and existing street lighting conduit crossings shall be incidental to the contract.**

The alignment of the curbs in existing streets must be matched in all locations. The proposed dimension at the sidewalk for each new concrete approach is indicated on the plan or marked in the field by the Engineer. All portions of **non-concrete** service walks necessarily disturbed for the curb construction must be salvaged and piled in such a manner as to protect them from damage during the work and shall be replaced in kind when work is complete, except concrete walks indicated by the Engineer for removal and new replacement. This work shall be incidental unless otherwise noted **in the plans or directed** by the Engineer.

The Contractor shall provide for a minimum of one finisher to remain on the project site after final finishing of all concrete until such time as said concrete has hardened sufficiently to resist surface scarring caused by footprints, handprints, or any other type of imprint, malicious or otherwise. An unreasonable amount of leaf imprints will be considered nonconforming. The finisher shall actively and continuously patrol on foot the newly placed concrete and repair any damage to the surface that might be sustained as described above. The cost for providing the finisher(s) and necessary equipment and materials shall be considered incidental to the contract unit price for each specific concrete item.

## 1. PAVEMENT

### a. GENERAL

The sequence of operations shall be strike-off, consolidation, screeding, float finishing, straight-edging, and final surface finish. The machine method of strike-off and consolidation shall be employed, except for those areas where the slab width is variable for strips or lanes of pavement uniformly less than 10 feet in width, and other areas where the use of machine methods is impractical, as determined by the Engineer who will then allow hand methods. All finishing equipment and tools shall be cleaned immediately after use and



kept clean so as to maintain such equipment in satisfactory condition during use. The Contractor shall provide whatever assistance is requested by the Engineer to check the adjustment and operating condition of the machine.

b. MACHINE STRIKE-OFF

1. After the concrete is deposited, the surface of the pavement shall be struck off by the use of an approved type of finishing machine. The screeds shall be adjusted to the grades indicated on the plans. The surface of the pavement shall be struck off a sufficient number of times to form a consolidated mass of concrete with a mortar surface at finished grade.
2. Immediately after the last pass of the finishing machine, the surface of the pavement shall be floated by the use of an approved mechanically operated float or a "pan" attached to the finishing machine. Each type of float finisher shall be in first class mechanical condition, adjusted to conform to required crown and grade and shall be capable of producing the required surface finish. The width of the "pan" type of float shall be less than the width to be paved.
3. The finishing of the pavement shall comply with the provisions of "Hand Strike-Off" as described in section "c" below. Unless otherwise specified, provide a final finish with an Engineer approved artificial turf drag or equal. Use a drag made of molded polyethylene with synthetic turf blades approximately 0.85 inches long containing approximately 7200 individual blades per square foot. Use a seamless strip of artificial turf approximately full pavement width and of sufficient size that during the finishing operation approximately 2 feet of turf, measured parallel to the pavement centerline, is in contact with the pavement surface. Pull the drag with an Engineer approved device that allows control of the time and rate of texturing. Operate the drag in the longitudinal direction to produce a finish acceptable to the Engineer. Weight the drag as necessary to maintain contact with the pavement. Keep each drag clean and free of particles of hardened concrete. Replace the drag as necessary to produce the desired finish.
4. All edges of each slab, including the edges of the joints, shall be floated by hand and finished with an edging tool with a ½ inch radius. At the proper time, depending upon the rate of set of the concrete, the contraction joints shall be re-cut and the finishing of the joints completed. The completed pavement surface, including areas at expansion and contraction joints, shall not deviate more than 1/8<sup>th</sup> of an inch from the edge of a 10 foot testing device.
5. SLIP FORM MACHINE STRIKE-OFF: Before constructing pavement with slip form machines, the following shall be checked by the Engineer and Contractor: the tracking area shall be uniformly graded so as not to produce undue stress on the self-leveling mechanisms. The machine must



have an operational, calibrated, variable slope control. The machine must have the ability to produce a cross section complying with the required crown sections shown on the plans or in the special provisions.

All vibrators must be in good operating condition. Slumped edges must be immediately corrected by the use of forms. In all cases, the use of the slip form machine shall produce a continuous cross section as shown on the plans. The use of hand methods in conjunction with the slip form equipment may be allowed only with the permission of the Engineer. The Engineer reserves the right to reject the use of this machine.

c. HAND STRIKE-OFF

1. After the concrete is deposited, the surface of the pavement shall be struck off with an approved type of screed that is cut to the required form of the pavement surface. A mechanical vibrator shall be attached to the screed. The surface of the pavement shall be struck off a sufficient number of times to form a consolidated mass of concrete with a mortar surface at finished grade.
2. The entire surface shall then be floated by means of a long handled float until all surface irregularities are corrected. The pavement must then be checked by pulling a 10 foot metal, **non-aluminum**, straight edge over the surface. For this purpose, the Contractor shall furnish and use an accurate 10 foot straight edge with a handle at least 3 feet longer than one-half the width of the slab. The straight edge shall then be held in successive positions parallel to the street centerline in contact with the surface and the whole area gone over from one side of the slab to the other as necessary. Advance along the street in successive stages of not more than one-half the length of the straight edge. Any depressions found shall be immediately filled with fresh concrete, struck off, consolidated, and refinished. Projections also shall be struck off and finished. The straight edge testing and refloating shall continue until the entire surface is found to be free from observable deviations or irregularities and the slab has the required grade and contour. Following this, the pavement shall be finished by dragging a seamless strip of artificial turf or a broom over the full width of the pour. This operation shall be done at such times and in such a manner that will produce a surface texture satisfactory to the Engineer.
3. All edges of each slab, including the edges of the joints, shall be floated by hand and finished with an edging tool with  $\frac{1}{2}$  inch radius. At the proper time, depending upon the rate of set of the concrete, the contraction joints shall be re-cut and the finishing of the joint completed. The completed pavement surface, including areas at expansion and contraction joints, shall not deviate more than  $\frac{1}{8}$ <sup>th</sup> of an inch from the edge of 10 foot testing device.

#### 4. CONCRETE BASE

- a. After depositing the concrete, the surface of the pavement shall be struck off with an approved type of screed that is cut to the required form of the pavement surface. A mechanical vibrator shall be attached to the screed unless otherwise allowed by the Engineer. The surface of the pavement shall be struck off a sufficient number of times to form a consolidated mass of concrete with a mortar surface at the depth below finished grade as indicated on the plans. A finishing machine will not be required unless stipulated in the Special Provisions.
- b. The entire surface shall then be floated by means of a long handled float until all the surface irregularities are corrected..

#### 2. SIDEWALK

After deposing the concrete, the surface of the walk shall be struck off at finished grade with an approved type of screed. A mechanical vibrator shall be attached to the screed if directed by the Engineer.

The surface shall then be worked with wood or metal, **non-aluminum**, floats until a uniform mortar surface is obtained. A hand float operated in a circular motion shall be the final floating operation. Immediately after the water glaze or sheen has disappeared, the surface troweling shall be performed with a rectangular steel trowel operated by hand in a circular motion. The application of neat cement to the surface is prohibited.

As soon as the concrete will retain its shape, the joints shall be re-cut with the jointer and the edges of all slabs rounded with an edging tool having  $\frac{1}{4}$  inch radius. After all troweling and edging is completed and the concrete has attained a partial set, the surface shall be brushed with a damp, soft bristle brush.

#### 3. CURB & GUTTER

Immediately after depositing and spading the concrete, the exposed surfaces shall be floated with wooden **or metal, non-aluminum**, floats, troweled, and edged. As soon as the concrete has sufficiently set, the face forms shall be removed and separator plates withdrawn. All exposed surfaces shall be checked with a **metal, non-aluminum**, straight edge 10 feet in length. All deviations shall be immediately corrected. The edges along the back of curb, flange, and the joints shall be finished with suitable tools.

The radii at the top and bottom of the curb face shall be rounded with special tools that fit the cross section. All exposed surfaces shall then be troweled smooth.

As soon as partial set has taken place and the water glaze or sheen has disappeared, the surface shall be brushed lightly with a damp, soft bristle brush.

## I. CURING TIME AND CLEANUP

Before opening the street to vehicular traffic, the Contractor shall clean the area of all forms, lumber, dirt, and other debris to the satisfaction of the Engineer.

The newly placed concrete shall be protected from carrying vehicular traffic until sufficient curing time has elapsed to permit traffic to use the area, i.e. when the concrete reaches 3000 psi or more in compressive strength. If new concrete is opened to traffic before the results of cylinder breaks are delivered, and the strength is found to be below 3000 psi on the day traffic was first allowed, to be determined by the Engineer, the City may require the Contractor to credit the project all or part of the cost for the concrete work since such pavement would be nonconforming. In severe cases the City may direct the Contractor to remove and replace the pavement at **the Contractors** own expense.

When a concrete saw has been utilized to cut joints, the Contractor will be required to clean the area of all forms, lumber, dirt, and other debris, and shall use equipment that will provide a flushing force capable of removing all residual materials of the sawing operation.

The Contractor shall restore in an acceptable manner all property, both public and private, which has been damaged in the prosecution of the work, and shall remove all surplus and discarded materials, rubbish, and temporary structures from the right-of-way and any adjacent properties to the satisfaction of the Engineer. The Contractor shall restore all work completed under other previous contracts which has been damaged by **the Contractors** operations, in a manner in conformance with the specifications for the item(s) involved.

All cleanup, repair, and restoration work shall be considered incidental unless otherwise indicated as separate bid items in the proposal.

## J. CONCRETE WORK DURING COLD WEATHER

Concrete shall be placed in accordance with Section 415 of the State Specs. The Engineer, at **their** discretion, may order the concrete work to cease, irrespective of air temperature, if it is anticipated that the temperature and/or wind chill will drop below freezing.

The Contractor shall remove and replace at **their** expense any concrete damaged by frost or freezing, irrespective of the fact that the Contractor may have had the approval of the Engineer to pour said concrete.

When concreting during cold weather, the water and the aggregates in the concrete mixture may be heated. When specifically allowed by the Engineer, the Contractor may use magnesium free calcium chloride as an admixture in the concrete at **their** own expense. The maximum quantity to be used shall not exceed 1% of the cement content of the mix.

Other methods of protection from freezing may be used with the written approval of the Engineer.

All costs associated with abiding by weather specifications for all materials shall be at the expense of the Contractor, unless specifically called out as a base bid item. The Engineer shall not be required to grant overall schedule, phasing schedule, or milestone schedule extensions due to weather, but the Contractor may still submit a written request for such extensions, within reason.

## K. MUDJACKING

### 1. GENERAL

The Contractor shall furnish all equipment, tools, and other apparatus necessary for the proper construction and acceptable completion of the work specified under this contract. The equipment shall be approved by the Engineer prior to starting the work, and maintained in good working condition by the Contractor during the progress of the work.

All necessary hoses, valves, valve manifolds, and positive cut-off and bypass provisions to control pressure and volume, pressure gauges with gauge protectors, expanding packers for positive seal grout injection, wood plugs, hole washing tools, and drill steel and bits shall be provided by the Contractor.

Prior to jacking any pavement, the slabs shall be closely examined for any existing cracks. This investigation shall be performed by the Contractor and the Engineer. Both parties shall agree regarding the existing condition of the pavement, and existing cracks shall be noted or marked.

The Contractor shall replace or repair any slabs broken due to jacking as determined by the Engineer. The Engineer may require the removal and replacement of the entire slab or a portion of the slab damaged by radial or transverse cracks.

### 2. WATER SUPPLY

If water tanks are not an integral part of the grout delivery machine, the Contractor shall supply water for delivery to the work site. See section 605.1.02A. Use of City Water for more information.

### 3. INJECTION HOLES & DRILLING

An air compressor and rock drill or other device capable of drilling the grout injection holes through the sidewalk slab and base material shall be provided. The equipment shall be in good condition. The holes shall be vertical and round. Down-feed pressure whether by hand or mechanical means shall not exceed 200 psi. Holes shall be drilled to prevent breakout at the bottom of the pavement.

Grout injection holes shall be drilled in a pattern approved by the Engineer. Holes shall not be larger than 2 inches in diameter, drilled vertically to a depth sufficient to penetrate through any chemically stabilized base, but not more than 3 inches into the subgrade. Holes shall be drilled so that breakout shall not occur at the bottom of the slab.

Subject to the Engineer's approval, holes may be washed or air blown to create a small cavity to allow the initial spread of grout.

After jacking has been completed at any one hole, the packer shall be removed and the hole temporarily plugged immediately with a tapered wooden plug. The temporary wooden plugs shall not be removed until the grout has set sufficiently so that back pressure will not force it through the hole. Each hole shall be permanently sealed flush with the pavement surface with a fast setting sand/cement or other patch material approved by the Engineer. The patch material shall have a minimum thickness of 3 inches.

#### 4. WEATHER LIMITATIONS

Pavement mudjacking shall not be performed when the ambient temperature at the bottom of the pavement slab is less than 40° F, or when the subgrade or subbase is frozen.

#### 5. GROUT MIXTURE

At least 2 weeks before the start of mudjacking operations, the Contractor shall submit the grout mix design to the Engineer for approval. Submit a mix design for each type of grout or blended material including a complete list of ingredients, admixtures, and set time.

#### 6. JACKING

An expanding rubber packer or other approved device providing a positive seal and connected to the discharge hose on the grout plant shall be lowered into the holes. The discharge end of the packer or hose shall not extend below the lower surface of the concrete pavement. The Contractor shall pump in a pattern and in the amount required to raise the pavement to within 1/4 inch of final grade. Grade tolerances shown in this section shall be applicable to transverse grades as well as longitudinal grades. Continuous pressures to 200 psi will be permitted. Pressures to 300 psi will be allowed only for short periods. In the event the pavement is bonded to the subgrade, brief pressure rises (10 seconds or less) to 600 psi will be allowed. **Loss of grout through cracks, joints, other injection holes, or from back pressure in the hose or in the shoulder area will not be tolerated.** Grout held in the mixer or in the injection pump or hose for more than 1 hour after mixing shall not be used for jacking.

The slabs shall not be raised more than 1/4 inch when pumping in any one hole at any time. No part of the slab shall lead any other part of the slab or any

adjacent slab more than 1/4 inch at any time. The entire slab and all adjacent slabs shall be kept on the same plane at all times, within the 1/4 inch tolerance. The Contractor shall make observations to assure that when pumping from one hole, the grout flows to adjacent holes to ensure that all voids are filled. The Contractor may cut a slab to prevent breakage when it is bound against an adjoining slab. If the temperature is 80° F, or higher during the jacking operation, the slabs shall be sufficiently moistened to prevent expansion of the slabs.

Upon completion of jacking operations, slabs within the work area shall present an even grade at each joint and shall not vary from the final elevations by more than 1/4 inch. If slabs are found that are lower than the specified tolerance from the final grade, these slabs shall be further jacked until the tolerance is met. Should any over-jacking be greater than 1/4 inch the Engineer has the option to require removal and replacement of the pavement. These repairs shall be accomplished at no additional cost to the City.

**The Contractor shall not permit pedestrian traffic on the pavement slab until the grout has set for a minimum of 24 hours.**

## 7. ACCEPTANCE OF WORK

Prior to acceptance, the Contractor shall remove loose concrete, joint filler, or grout spilled on the surface or shoulder. Waste construction material shall be removed and the surrounding areas shall be left in a neat, orderly condition by the Contractor prior to opening to traffic or final acceptance.

## L. TESTING

The Engineer may, at any time, perform **one or a combination of** concrete tests including, but not limited to, strength, air content, **slump**, and temperature as they see fit. The Engineer may also perform plant inspections and source material testing in accordance with the State Specs. The Contractor is free to perform their own testing at their own expense whenever they choose.

Should the Engineer perform testing but the Contractor chooses not to test on their own, the Contractor waives their right to dispute any testing results, except in cases where gross negligence of acceptable industry methods was documented. **The Contractor is solely responsible to cast strength cylinders for their use to determine the permissible timing to reopen concrete pavements, approaches, and sidewalk to use that they determine necessary and/or to meet specific contract requirements.**

## M. PAYMENT

Payment adjustments for any pavement items, including but not limited to streets, alleys, walks, and drives, may be made in accordance with the table shown below, at the discretion of the Engineer:

Deficiency in Thickness Determined by Cores (in.)	Proportional Part of Bid Price Allowed
0.00 to 0.25	100%
0.26 to 0.35	80%
0.36 to 0.45	72%
0.46 to 0.55	68%
0.56 to 0.75	57%
0.76 to 1.00	50%

Areas of pavement determined to be deficient in thickness by more than 1 inch shall be removed and replaced by the Contractor at **their** expense with concrete pavement of specified plan thickness. The Engineer may permit the deficient pavement to remain in place, in which case the value of the nonconforming area will be deducted from monies owed to the Contractor.

City Verification cylinders will be at a minimum taken as follows by HTCP or ACI certified technicians:

Class I Concrete, as defined by State Specs, will have (3) cylinders made for testing at least once per 800 CY of concrete placed or at minimum of once daily.

Class II Concrete, as defined by State Specs, will have (3) cylinders made for testing at least once per 400 CY of concrete placed.

The City will have a certified testing lab test the cylinders for compressive strength. Payment adjustments for any concrete items, including but not limited to streets, alleys, walks, and drives, may be made in accordance with the table shown below, at the discretion of the Engineer, for the full amount of concrete placed between City Verification Cylinders:

Deficiency in Average Strength Determined by Cast Cylinders	Proportional Part of Bid Price Allowed
3600 PSI or Greater	100%
3400 – 3599 PSI	95%
3000 – 3399 PSI	90%
2500 – 2999 PSI	80%
Less than 2500 PSI	Remove & Replace

The Contractor, at their own cost, may elect to take cylinders at the same or increased frequency for their own quality control purposes.

### 620.3 – ASPHALT CONSTRUCTION

This work shall consist of the construction of plant mixed hot mix asphalt (HMA) pavement on the approved prepared foundation, base/binder course, or existing surface in accordance with the specifications and in reasonably close conformity with the lines, grades, thicknesses, and typical cross sections shown on the plans or established by the Engineer.

Asphalt construction shall conform to the requirements of Sections 450, 455, 460, and 465 of the State Specs.

Bituminous pavement shall not be applied to wet material, or when the material below is frozen, or when the atmospheric temperature is lower than 35°F and falling (35°F and rising is acceptable). Asphalt and Portland cement concrete shall not be placed during rainfall, snow storms, or any imminent weather that might adversely affect the construction. The Engineer will determine when surfaces and material are dry enough to proceed with construction.

Tack coat shall not be applied when the surface temperature is less than 40° F. Exceptions will be permitted only in special cases and only with prior written approval of the Engineer.

All sweeping, cleaning and preparation of the base/binder surface for topping must be completed prior to the paving crew arriving on the site.

#### A. GENERAL

When the surface has cooled to a temperature of 140° F or less, the edges of longitudinal joints shall be painted with hot asphalt cement, or heated to the point of softening with an infrared joint heater, before work is resumed.

The finishing machines shall lap previously laid HMA material a minimum of 3 inches and the material left sufficiently high to allow for compaction. The longitudinal joints in each layer shall be offset from the previous layer by a minimum of 6 inches.

Placing of the asphalt mixtures shall be as continuous as possible. The width of paving passes shall be adjusted so the locations of longitudinal joints do not coincide for successive passes. However, whatever the width of a pass, the action of the spreader on the mat must be uniform throughout the width of the mat.

All milled butt joints, in drives where there is no existing joint, are to be sawed, prior to milling.

No asphalt mixtures shall be laid when the air temperature is below 35° F unless permitted by the Engineer. Binder mixture shall be spread at a temperature between 225° F and 325° F, and the surface mixture at a temperature between 250° F and 340° F.



The use of hand tampers or other non-mechanical compaction methods is prohibited. The Contractor shall protect all sections of the newly compacted mixture from traffic until they have been cooled and hardened to the satisfaction of the Engineer.

## 1. MATERIALS

The materials, equipment, and methods used to produce an HMA pavement shall, unless otherwise directed in these specifications, conform to the requirements of sections 450, 455, 460, and 465 of the State Specs. All asphalt used for this contract shall have the grade PG58-28 unless given written direction by the Engineer **or otherwise specified**.

Bidders shall submit a statement setting forth a source of all aggregates and asphalt materials to be used. All materials must be secured from sources which in the past have produced satisfactory asphalt paving mixtures in the vicinity of Wauwatosa and the source of materials shall be adequate for this project.

In the State Specs, *Upper Layer* and *Lower Layer* are synonymous with surface course and binder course respectively.

- a. **RECYCLED PAVEMENT**: The Contractor may, at their option, use recycled asphalt pavement. The bituminous base or base/binder course mixtures may contain a combined maximum of 35% (25% combined maximum for surface course mixtures) of fractionated reclaimed asphaltic pavement (FRAP) and reclaimed asphaltic pavement (RAP). The City Engineer reserves the right to approve the source and actual quantity of the reclaimed asphalt pavement to be used. Recycled asphaltic shingles (RAS) are not permitted.

If the project requires the Contractor to mill or grind off existing pavement, the milled pavement or grindings shall become the property of Contractor and must be removed at the Contractors expense.

Where sewer or water construction takes place on streets which are to be repaved in the same construction season, binder material may be used for the surface course but only within the proposed paving limits **as approved by the Engineer**.

## B. ADJUSTING UTILITY FRAMES

The Contractor shall adjust to finished grade all catch basins and City manhole frames. The masonry mortar and concrete bricks shall comply with the requirements of section 519 of the State Specs. Utility frame adjustments may include rebuilding block or brick as designated on the plans, or as determined by the Engineer.

The Contractor shall remove the existing catch basin or manhole frame, adjust the top of the existing masonry structure, and reinstall the frame.

Adjustment on manhole frames in asphalt pavement to finished grade shall only be done after the lower layer of hot mix asphalt pavement is completed on asphalt pavement and asphalt resurfacing projects. The lower layer of hot mix asphalt pavement shall be removed only after a vertical edge has been sawed in a box around the frame. The removal and sawing of any lower layers shall be incidental to the work. Backfilling around the frames after adjustment shall be done with compacted fill as specified for the pavement base, and compacted asphalt base/binder material, at Contractor's expense.

The area of asphalt removed around the frame shall be large enough to fully accommodate compaction by a self-propelled pneumatic roller completely within the patched area. **The use of plate compactors will not be permitted for compacting the base aggregate dense and lower layer of HMA around manholes.**

If only one layer of asphalt is to be laid, then the adjustment of catch basin and manhole frames shall be done before the upper layer is laid.

While performing the masonry work involved in making adjustments, the Contractor should provide the means to intercept dropped materials before they reach the bottom of the structure.

## 1. SURFACE REQUIREMENTS

The Contractor shall set the frames, grates, and lids accurately so the complete installation is at the correct elevation required to fit the adjoining surfaces. The frames shall be set in pavement areas so that they comply with the following surface requirements.

Place a 6 foot straightedge over the centerline of each frame parallel to the direction of traffic at the completion of the paving. Make a measurement at each side of the frame and average the two measurements. If this average is greater than 5/8 inch, reset the frame to the correct plane and elevation. If this average is 5/8 inch or less but greater than 3/8 inch, the City will allow the frame to remain in place but shall pay only 50% of the contract unit price for adjusting catch basin or manhole frames. If the frame is higher than the adjacent pavement, then make the two measurements at each end of the straightedge and average them.

The Engineer in the field is permitted to direct adjustment measurements to be taken at different locations and/or with different reference points wherever they deem necessary e.g. if a frame is close to the edge of the curb flange.

## C. ADJUSTING WATER VALVE BOXES

The Contractor shall furnish all labor and equipment necessary to adjust all water valve boxes within the street right-of-way within the actual work limits. This work requires the boxes to be placed at finished grade and be operational.

In asphaltic pavement, all valve boxes shall be set to finished grade after any binder courses and prior to installation of the surface course.

After the pavement is installed, if the City Water Department determines the valve is inoperable due to displacement or faulty adjusting or lack of protection, the Contractor will be required to perform all work necessary to correct the condition with materials, and make the valve operational at **the Contractor's** own expense within 5 days of notification by the City.

#### D. QUALITY CONTROL

The cost of furnishing a quality control program and providing the tests and reports as specified, including density testing, shall be considered incidental to the pavement bid item.

The Contractor shall provide and maintain a quality control program. A quality control program is defined as all activities, including mix design, process control inspection, sampling and testing, and necessary process adjustments related to producing and placing HMA pavement conforming to the specifications.

The testing shall include density testing of in-place HMA pavement with the use of nuclear density gauges. Section 460 of the State Specs shall be modified by these specifications to require the Contractor to test for nuclear density a minimum of every 300 feet. The Contractor shall perform HMA pavement density testing with nuclear gauges operated by a Nuclear Technician I who has been certified by the Highway Technician Certification Program. The Contractor shall furnish nuclear gauges from the State of Wisconsin's **most current** "List of Approved Nuclear Density Gauges".

The Contractor shall select the test site, station, and offset distance randomly as specified in the State of Wisconsin Construction & Materials Manual. When requested, the Contractor shall provide the Engineer with the original data sheet for each lot within 24 hours of testing completion for that lot. A lot represents 750 tons of a mixture placed within a single layer for each location and target maximum density category.

The Contractor shall not re-roll compacted mixtures with deficient density test results or operate continuously below the specified minimum density. The Contractor shall stop production, identify the source of the problem, and make corrections to produce work meeting specification requirements.

The Engineer may at any time request that a sample of HMA be taken from the field or plant by the Contractor at the Contractor's expense, or perform a plant inspection.

#### E. CONTRACTOR ASPHALTIC MIXTURE DESIGN

For each course, the Contractor shall submit, for the Engineer's review, an asphaltic mix design meeting all necessary criteria. The asphaltic mix design shall consist of

aggregate gradations, aggregate blend percentages, Job Mix Formula (JMF), recommended asphalt content, recommended plant mix temperature range, and shall be signed by a Certified Asphaltic Technician III. The design shall be conducted according to procedures in the latest version of the Department's Test Method 1559, Standard Method of Asphaltic Mix Design. The Contractor will run tests on the quality of the aggregates, review the asphaltic mixture design and issue a report. The asphaltic mixture design shall be in effect until modified, in writing, by the Engineer.

The submitted mix design report must be approved by the Engineer or **their** authorized testing laboratory before paving can begin.

#### F. SAMPLES

For the purpose of mix design verification, the Contractor shall supply aggregate samples (upon request only), representative of the average gradation of the job materials, along with the complete Contractor Asphaltic Mix Design, to the City at least 14 calendar days prior to use in the work. No aggregate shall be used in the production of mixtures without prior approval of the Engineer.

The Engineer may at any time request that a sample of HMA be taken from the field or plant by the Contractor at the Contractor's expense, or perform a plant inspection.

#### G. PREPARATION OF BASE

The surface of the base shall be clean, dry, and free of foreign material before paving commences. If the HMA is being placed in multiple lifts, each lift shall be clean, dry, and free of foreign material before applying tack coat for the next lift. The binder and surface course mixtures shall be laid only upon a base which is dry, and only when weather conditions are suitable as determined by the Engineer.

When directed by the Engineer, all breakups, depressions, or any other distressed or unsatisfactory areas of the existing foundation to be paved will be repaired, and the surface cleaned, prior to placement of the binder and/or surface course. The cost of preparing the foundation to be paved, repairing the old existing base or pavement, and prime or tack coats are incidental to the pavement construction and should not be considered a separate item *unless so designated in the proposal*.

##### 1. DENSE GRADED BASE

Prior to placing the lower layer, the Engineer may require that the dense graded base be proof-rolled with a fully loaded tandem-axle dump truck. Any soft, spongy, or otherwise unsuitable areas shall be removed as necessary and replaced with base aggregate dense, gradation 1-1/4 inch.

## 2. TACK COAT OF CONCRETE OR HMA PAVEMENT

Except when otherwise specifically provided by the contract or ordered by the Engineer, penetration tack coat shall be placed in a single application. Tack Coat shall conform to 455.2.5 of the State Specs. Surfaces shall be clean and dry before tack coat is applied.

After the binder or concrete base has been placed, as applicable, apply an asphalt tack coat at 0.05 to 0.07 gallons per square yard after dilution to the surface of concrete base or the binder course and to the edges of the existing pavement, and on any subsequent lifts of binder course. The Engineer may adjust the application rate based on surface conditions. Also tack coat manhole and inlet frames below grade.

The rate of application of asphaltic material shall be determined on the basis of the condition of the surface to be treated and the requirements to produce contemplated results and the amount per square yard to be applied will be specified by the Engineer. The asphaltic material shall not be applied at such a rate as will cause it to flow off the surface. The grade of emulsified asphalt and the time interval between application of tack and laying of HMA pavement shall also be entirely at the discretion of the Engineer.

In addition to the general application of a "tack" coat prior to laying the final surface, hand spraying of "tack" must be performed along all curb flanges and all transverse butt joints and feathered ends. The distributor truck must remain within 500 feet of the surfacing crew to avoid "tacking" too far ahead. The Contractor may be required to remove "tack" that may have been tracked, or carelessly sprayed, on concrete surfaces.

The Contractor shall apply tack coat as directed by the Engineer. Tack shall be considered **incidental** to paving unless noted as a separate bid item.

### H. CONCRETE BASE PREPARATION

Concrete base shall conform to section 501 of the State Specs.

Prior to HMA pavement resurfacing, the surface of the existing concrete pavement shall be prepared as follows:

Existing asphaltic surface and all loose patching material or asphaltic patches which protrude above the existing concrete pavement shall be removed. This removal shall be accomplished by scraping of the pavement with the blade of a motor grader or other approved means.

Joint, crack, and pavement surface spalls exceeding 1-1/2 inches in width, with a depth of less than 4 inches, shall have all loose or deteriorated concrete removed to sound concrete. The void shall be vacuumed thoroughly clean. Any joint and crack repair over 4 inches deep will be removed and replaced and

paid under the respective items for concrete base patching. Tie bars must be used in any area where patches abut existing concrete.

The cleaned void shall be filled with HMA to the level of the pavement and compacted by hand operated vibratory compactors and/or motorized rollers approved by the Engineer. HMA shall be placed in lifts to insure complete compaction.

Alternate methods and materials may be used when approved by the Engineer in writing. Requests for use of alternate methods and materials must be submitted at least 2 weeks prior to the date of proposed use.

## I. PAYMENT

Payment for the HMA pavement of various types as shown on the plans is full compensation for providing HMA mixture designs, quality control program, testing (including density testing), and for furnishing, preparing, hauling, mixing, placing, and compacting the mixture used in the upper layer, lower layer, and leveling courses, and for furnishing all materials including asphaltic materials.

HMA pavement shall be paid for at the contract unit price per ton (2,000 lbs), unless it is noted that payment is in square yards. Material must be weighed on a scale approved by the Engineer and weight tickets showing the gross, tare, and net weight of each load must be supplied to the Engineer or Inspector at the time of delivery. Payment will be made for the tons of material incorporated in the work. Such payment shall be the full pay for all equipment, material, and construction costs.

Tack coat shall be paid per gallon if it is included in the proposal as its own bid item. Otherwise it shall be incidental to the work.

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## **SECTION 670 – Street Lighting**

### **670.1 – GENERAL**

The Contractor shall coordinate with WE Energies to energize service at electrical service/lighting control cabinets and disconnect any electrical services as needed at their own expense.

#### **A. PROJECT REQUIREMENTS**

All electrical work shall be performed by a state licensed electrical contractor, and where pertinent, conform to the State of Wisconsin Electrical Code and good electrical construction practices. The Contractor shall maintain the street lighting systems in such a fashion as to provide for their continuous operation throughout the contract to extent required, which shall be incidental to the work unless stated as a separate bid item.

Work shall conform to Sections 204, 651, 652, 653, 654, 655, 656, 657 and 659 of the latest State Specs and the latest adopted State of Wisconsin Electrical Code, except as modified herein, and the City Specs.

The work under this section includes additions and modifications to the existing City of Wauwatosa street lighting system as shown on the drawings and as specified. All work, including repairs, shall be inspected by City staff. The Contractor shall furnish and install, as incidental unless specifically noted as a separate bid item, all items needed to make the proposed system complete from the source of supply to the most remote unit. Such items include, but are not limited to, wire nuts, grommets, tape, connectors, conduit lock-nuts varnish, and putty.

The Contract drawings for electrical work are in part diagrammatic, intended to convey the scope of work and indicate the general arrangement of, including but not limited to, equipment, cable, conduits, and approximate sizes and locations of equipment and material. They are not to be used for obtaining lineal runs of wire or conduit. Unless otherwise noted, no measurement of an electrical drawing derived by scaling shall be used as a dimension with which to work. Dimensions noted are subject to field measurement of existing construction. All required measurements shall be performed by the Contractor prior to the installation of equipment.

Traffic control devices required for the street lighting work shall be considered incidental to the work under this Contract if a bid item for traffic control is not listed in the proposal. See Section 605 General Provisions in the City Specs for more details on traffic control requirements.

## 1. CONTINUOUS OPERATION OF STREET LIGHTS

If there are overhead and underground utility facilities located within the project limits, refer to the plans and specifications for any anticipated utility adjustments.

The Contractor shall coordinate his construction activities with a call to Diggers Hotline or a direct call to the utilities which have facilities in the area as required per statutes (see General Provisions for a detailed list of utility contact information).

Contractor shall be responsible for locating existing underground street lighting and traffic signal cables within the project limits.

Bidders are advised to contact each utility company prior to preparing their bids. Any damage to public or private utilities shall become the responsibility of the Contractor. Satisfactory repair or replacement shall be completed at the Contractor's expense.

Where there is enclosed or unenclosed lighting cable within the project limits, care must be exercised by the Contractor to avoid damage to the cable during work. Where the Contractor or any of his subcontractors damage any part of the lighting system which results in inoperative street lights or traffic signals, or an outage has occurred anywhere within the project limits, the damage shall be repaired by a qualified electrician at the Contractor's expense in accordance with City specifications. All lighting systems shall be kept 100% operational.

### a. TIME LIMITS FOR REPAIRS

The Contractor shall have **24 hours** from the report of a problem to inspect and identify the cause. Repairs shall be made no later than **3 days** after the problem is identified. The Contractor may also, at their own expense, install overhead facilities to accelerate the return of functional electrical systems to meet the time limits outlined herein.

Should these limits be exceeded, the Engineer reserves the right to hire a third party, independent of the Contractor, or use City workers to perform the repair(s). The cost of hiring a third party or using City workers and having them repair the damage will be paid for by the Contractor. Contractor agrees they will be informed of the final cost, which will be deducted from monies owed in a subsequent payment. In lieu of hiring a third party or using their own staff, the Engineer may also choose to fine the Contractor as they see fit for the circumstances, to be charged each day the lights are not properly functioning outside of aforementioned time limits,

and to be deducted from monies owed to the Contractor.

b. TEMPORARY LIGHTING

If no plans for temporary lighting are included in the Contract Documents, the Contractor may choose, at their own expense, to maintain street lighting via overhead connections to existing poles, the installation of temporary poles and luminaires with their own wiring, or splicing (in existing wires only) around new and/or old poles and/or pole bases, as needed.

Temporary lighting systems shall maintain equal or better lighting levels throughout the area of construction. The Contractor may propose to reduce these levels by submitting a plan to the City for review and approval to reduce light levels on the project. The plan shall indicate all existing and new lighting proposed to be in service and show what lighting is being proposed to be reduced or removed as part of the temporary lighting for the project. If the City does permit reduced lighting levels within the construction, the Contractor is still responsible for maintaining connections to allow 100% lighting capacity for any circuit(s) that continue beyond the construction limits of the project.

Whenever the Contractor is doing work that involves splicing into existing lighting systems, a tag system shall be employed at the distribution center.

The Contractor shall attach an appropriate tag on all circuits which are required to be opened during the course of his work. Such tags shall bear the date, Contractor's name, and individual worker's name indicating to others that work is being performed on the system.

At the conclusion of work operations on a particular distribution center, the Contractor shall remove such tags and re-energize the affected circuits.

See section 670.1 B. 8 below for detailed requirements.

- i. All temporary lighting shall be in accordance with Wisconsin Electrical Code, the sections of the State Specs as mentioned in Section 670.1 A. above, the City Specs, and any applicable Federal, State, and Local laws.

2. PERSONNEL QUALIFICATIONS

Perform all electrical work using a journey worker electrician or an

electrical apprentice under the onsite supervision of a journey worker electrician. Electrical work is defined as any electrical and related construction required to be performed by the Contractor under this contract.

### 3. QUALITY ASSURANCE

All electrical materials shall conform to the latest requirements of the Wisconsin State Electrical Code (defined as the NEC plus the Wisconsin Supplemental Volumes).

All electrical materials to be furnished and installed under the contract shall comply with the provisions of the Underwriters Laboratories, Inc. and shall be UL listed and labeled.

#### B. GENERAL MATERIAL REQUIREMENTS

All materials furnished by the Contractor for lighting installation under this contract are subject to approval by the Engineer. Materials and equipment by manufacturers other than those specifically named will not be considered. Unless otherwise stipulated in the specifications or noted on the drawings, all materials and equipment incorporated in the work shall be new and unused and in complete accordance with the specification requirements. Materials and/or work not specifically identified as or in a bid item shall be considered incidental to work, and shall be included with the cost in appropriate bid item(s). All electrical materials to be furnished and installed under the contract shall comply with the provisions of the Underwriters Laboratories, Inc. (UL) and shall be UL listed and labeled.

It is the Contractor's responsibility to verify the catalog numbers shown on the plans and specifications, and update same before submitting shop drawings. Any catalog number revisions or subsequent material cost increases shall be made at no additional cost to the contract whether it is because of a different type or mounting due to project conditions, discontinued catalog numbers or other such issues. In the case of discontinued catalog numbers, the electrical contractor shall bring it to the Engineer's attention with the manufacturer's recommended substitution before shop drawings are submitted so that the appropriate equipment can be selected by the Engineer.

Bonding wire shall be installed in conduits for equipment grounding. All equipment shall be grounded as required.

#### 1. CABLE, DUCT, AND CONDUIT

##### a. ELECTRICAL WIRE

All conductors and tracer wire shall be in strict accordance with Section 655 of the State Specs. Conductors shall be of the gage indicated on the plans, stranded copper, XLP insulated, USE rated wire, placed where indicated on the plans, with number of required conductors as indicated on the plans. Conductors shall be installed in duct. No direct-bury proposed conductors shall be allowed without the written permission of the Engineer.

Feeder conductors shall be black or red, and where two of this type are called for on the plans, one shall be black and one shall be red. Neutral conductors shall be white and grounding conductors shall be green. Tracer wire shall be orange or of the color indicated on the plans. Other cable types shall be of the color indicated on the plans or as directed by the Engineer.

b. HDPE Duct

Duct shall be in accordance with Section 655 of the State Specs, Type TC7, Schedule 40, UL listed, and shall be black with a red stripe for electrical installations. Duct shall be installed in the size(s), location, and number as indicated on the plans, and all the way through the tops of bases.

c. Nonmetallic Conduit/PVC

All conduits and sleeves shall be rigid PVC Schedule 40 in accordance with Section 652 of the State Specs, and of the size(s) indicated on the plans. Conduit sleeves for HDPE duct shall be installed at any roadway crossing, in concrete bases, and any other location as shown on the plans and in the detail drawings.

In junction boxes, ducts that are entering shall be cut off no higher than one-half the depth of the box but a minimum of 3" above the gravel base in the box unless otherwise approved by the Engineer.

2. FIXTURES/LUMINAIRES

The contractor shall consult the plans and/or proposal for product numbers and types of fixtures/luminaires to be installed. Either a 10% overage of fixtures or 3 each, whichever is greater, shall be delivered to the City Department of Public Works and shall be incidental to the bid item for fixtures/luminaires.

LED luminaires shall be of a slim, low profile design that minimizes wind loading. Luminaires shall be constructed of cast and extruded aluminum with integral, weather-tight LED driver components with high

performance aluminum heat-sinks. Each luminaire shall use a terminal block for power input suitable for #6 through #14 AWG wire.

The arm mount luminaire shall be designed for installation on a 2-inch nominal diameter mast arm.

Luminaire design shall be modular to accommodate varied lighting output by use of LED light bar modules and/or differing driver outputs. The LED shall have a nominal color temperature of 3000K with a minimum of 70 CRI. Drivers shall operate with an input voltage ranging from 120-277V, 50/60 Hertz, +/-10% as standard. LED drivers shall have a power factor greater than 90%. Anticipated L90 at 25°C shall be 100,000 hours or greater. All luminaires shall come equipped with an integral surge suppression protection standard and a quick disconnect harness suitable for mate and break under load provided on power feed to the driver.

The finish shall be factory applied powder coat durable Gray topcoat, providing resistance to corrosion, ultraviolet degradation, and abrasion. Luminaire manufacturer shall provide a minimum of 10 year warranty on materials and finish.

Luminaires shall be rated and/or certified UL listed for wet locations, IP-66 minimum enclosure rating, IDK dark sky full cutoff compliant, and Design Light Consortium (DLC) qualified. Luminaires shall be provided in a 3000K temperature color unless otherwise specified or directed by the Engineer.

Pole and Bracket Cable shall consist of two insulated single conductors for each luminaire. Conductors shall be stranded copper, AWG #10, 600V, Type XLP-USE having an insulation thickness of at least 45-mils. The conductors shall be continuous, without splices from the underground feeder connection or fuse holder, to the terminals at the luminaire. A sufficient length of excess cable shall be provided at each pole to permit the removal and servicing of the fuse assembly from outside the pole.

### 3. THREADED FASTNER REQUIREMENTS

These special provisions require the corrosion preventative compound described in Sections 657.3.1(3) and 657.3.5 of the State Specs. Any and all fasteners and other attachment hardware used on the pole

shaft shall be stainless steel unless otherwise approved by the Engineer.

All threaded fasteners (including but not limited to anchor bolts, screws, and bolts) shall be liberally coated with an Engineer approved anti-seize compound, and excess shall be wiped off. Excepting fasteners inside control cabinets, fasteners up to half an inch in diameter shall be stainless steel. Rust, corrosion, and anti-seize protection shall be provided at all threaded assemblies by coating all mating surfaces with an Engineer approved compound. Aerosol cans of anti-seize material are NOT acceptable. Anti-seize material shall be painted or dipped on threads.

#### 4. FINISH REPAIRS

Unless otherwise specified, mars and scratches on painted equipment shall be touched up with two coats of color matched synthetic resin enamel, or with two coats of color matched zinc rich paint acceptable to the Engineer or as directed by the Engineer. Cold galvanizing paint shall be applied to steel surfaces prior to applying paint.

#### 5. PULL BOXES

Covers for pull boxes shall say "STREET LIGHTING" when used in a lighting circuit.

Pull boxes shall be rectangular precast polymer concrete, reinforced by a heavy-weave fiberglass (Quazite or Engineer approved equal), 17"x30" with 18" depth, style Quazite PT, open bottom (flared), and Tier 15 rated. Covers shall be heavy duty, bolted, skid resistant with a minimum coefficient of friction of 0.5, and in concrete gray color. The cover fasteners shall be stainless steel captive 3/8-inch hex head bolts with stainless steel inserts.

Pull boxes shall be placed at all locations indicated on the plans or approved by the Engineer. When indicated on the plans, "communications" pull boxes, as described below, shall be used in the street lighting work where shown, and shall read "STREET LIGHTING" on the cover.

##### a. COMMUNICATIONS

Pull boxes for communications shall be the same as described above, except they shall have nominal sizes of 24"x36" and 42"

deep, unless otherwise shown on the plans. The cover shall read "COMMUNICATIONS".

## 6. LIGHT POLES

### a. ALUMINUM LIGHT POLES

Light poles shall be Valmont brand or Engineer approved equal.

The completed lighting unit shall be of such design as will withstand all loads to which the units will be subjected in the field, including the loads applied by the materials attached to the lighting units, in conformance with the latest edition of the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals. Use a design life of 25 years. Design to withstand a 3 second gust wind speed of 90mph (145km/h).

Poles shall be one extruded piece of 25-foot tapered aluminum, with 6063 satin finish, 0.156 wall thickness, 4-bolt mounting with 1 1/2" bolt circle, and single member 6-foot mast arm, or as shown in the plan details. Pole shall be Part No. RTA25C8B4 with No. 69772-001 mast arm as manufactured by Hapco Aluminum Pole Products or Engineer approved equal, unless otherwise shown. Any and all fasteners and other attachment hardware for the pole shaft shall be stainless steel unless otherwise directed or approved by the Engineer, and shall be incidental to the pole.

Shafts with arm mounted luminaires shall have a J-hook at the top of each pole to provide strain relief for the cable.

Provide a welded mounting plate to accommodate side mount luminaire(s) as incidental to the pole. Exact dimensions to be coordinated with the luminaire to match end (arm) dimensions.

### b. CONCRETE POLES

The poles shall be sky gray colored, polished finished with acrylic seal.

All standards furnished shall be cast in metal molds true to design. Time of mixing shall be sufficient to ensure that all particles shall be thoroughly wetted.



The pole shafts shall be fiber reinforced, air-entrained concrete, with 5/8" minimum coverage over reinforcement (7,000 psi minimum). Concrete shall be placed in one continuous operation. When filled, the mold shall be rotated at a high speed to insure a dense concrete by centrifugal force, and produce a cable raceway throughout the length of the standard not less than 2 ½" at the location of the hand holes and a minimum of 1 ½" at top of pole. The poles shall then be polished to a smooth ground finish. Reinforcing shall be in accordance with this specification to assure that no cracking shall occur during normal handling.

The span concrete poles are to be octagonal in shape and carry a 0.125 inch/foot taper, and have a sky gray finish. Shaft length is in general to be a minimum of 27'-7" and a maximum of 28'-0". The pole is to be 23'-0" above grade. The butt diameter shall be 8" minimum and the top diameter shall be 5" minimum. The hand hole shall be 2 ½" x 12" minimum and 18" above grade and located on the opposite side of the pole from the curb. Two cable entrances shall be provided across from one another to run parallel with the curb line. Cable entrances shall be 18" below grade and a minimum size of 2-1/4" x 8". Cable entrances shall be sufficient in size to allow a single 1" conduit to enter the pole and terminate no less than 3" below the hand hole but no more than 6" below the hand hole.

The hand-hole cover shall be flush with pole. Poles shall be furnished with flush aluminum cover plate for hand hole and all other necessary hardware. This hardware shall include a removable metal cap which will protect the required open cable raceway at the top from the weather, nonferrous inserts for securing accessories such as cast aluminum pole cap, bracket brace, hand hole cover, etc., 6'-0" x 2" dia. mast arm of galvanized steel or aluminum with 1-1/4" slip fitter, stainless steel or silicone bronze nuts and bolts. Brackets for mast arm are to be one piece (no welds).

Manufacturer's conformance to specifications shall be certified by an independent testing laboratory.

All poles shall be guaranteed against defect for a period of 5 yrs. If defects are discovered, poles shall be replaced on a two-for-one basis.

#### c. POLE CABLE & FUSE

Conductors from the underground cable network shall be Type RHW-2/USE-2 (XLP) individual conductors. In each utilized phase

conductor in the hand-hole, there shall be installed a 1-pole secondary inline 600 VAC fuse assembly as manufactured by BUSS Tron HEB series fuse holder with weatherproof boots, or Engineer approved equal, with a KTK fuse. Conductors shall have sufficient length to permit removal of the fuse assembly through the hand-hole of the pole.

Exposed ends of fuse holders shall be taped thoroughly with 3M 130C linerless rubber insulating tape and 3M Scotch Super 88 vinyl tape or Engineer approved equal.

d. BASES

Shall be constructed in accordance with Section 654 of the WisDOT Standard Specifications and as shown on the plans, and the requirements of the pole manufacturer.

Light pole bases shall be round, 20" diameter by 5' deep reinforced concrete, unless otherwise shown on the plans. Bases shall have anchor bolts cast in place with the base. The Contractor shall confirm bolt placing and circle diameters with the pole supplier(s) before pouring bases. Bases of a non-circular shape will not be accepted unless such bases are noted to be installed in the plans.

Bases shall be excavated by use of a circular auger. Top surfaces of concrete bases shall be trowel finished and level with a 1-inch chamfer around the entire top edge. Backfilling and compaction of areas disturbed by construction operations shall be considered incidental. All form material exposed to view shall be removed by the contractor.

Factory made PVC elbows shall be cast in the base as sleeves for the cable-in-duct, incidental to the base. Location and size shall be as shown on the details or directed by the Engineer. Elbows shall be installed in an orientation as to permit conduit to be installed in as nearly a straight-line run as possible, without bends. It is acceptable to the Engineer if the Contractor achieves this by "crisscrossing" the vertical portions of the elbows in the base, and/or orienting the elbows so the tops protrude from the top of the base and are cut down later, in order to create a more gradual curve inside the concrete. The sleeve opening in the side of the base shall be no less than 18" below the concrete top of the base.

Bases shall be constructed so as to center the pole on the concrete. The Engineer may require off-center pole bases to be removed and reinstalled at the Contractor's expense, or the Engineer may reduce payment for each off-center base. Sonotube

and other forming materials shall be removed from the exposed portion of bases before completion.

## 7. LIGHTING CONTROL CABINET

The lighting control cabinet shall include a new concrete foundation, NEMA 3R enclosure, panelboard, time clocks, contactors, photocontrol, circuit breakers, wiring, and all equipment and materials as shown in the plans and as listed below, as incidental to the cabinet item. The cabinet with all of its electrical components, wiring and parts shall be listed and labeled by Underwriters Laboratories (UL) or other nationally recognized testing laboratory as a completely assembled unit.

All materials furnished for this portion of the work shall be Listed and Labeled by UL or other National Recognized Testing Laboratory.

Provide factory PAINTED finish on enclosure, meter pedestal and exterior mounted disconnect switch and any exposed conduits to match color of street lighting poles/luminaires.

Provide "LIGHTING CONTACTOR" or "RECEPTACLE CONTACTOR" (1/4") engraved identification plaque on respective contactor.

Provide "LIGHTING" or "RECEPTACLE" (1/4") engraved identification plaque on respective H-O-A switch.

### a. ENCLOSURE

Control enclosure shall be manufactured by Bison Pro Fab (800) 825-5805, APX Enclosures (717) 328-9399, or Engineer approved equal.

Control enclosure shall be NEMA-3R made from 12-gauge Type 304 stainless steel. Seams shall be continuously welded and ground smooth. All hardware shall be type 304 stainless steel.

Enclosure shall be free standing with an overall height of 54-inches, a width of 48-inches and a depth of 24-inches. Enclosure shall have a 2-inch wide inside flange at the front, back, and sides for anchoring to base. Side and back walls shall be stiffened with 2 vertical stainless steel equipment mounting rails per wall. The door frame shall be double flanged.

The cabinet top shall be sloped to drain and shall have a drip shield over door. Provide screened vent slots (1/8-inch x 1-inch) under the cabinet overhang located in the top face above door opening.

Outer door shall be NEMA 3R, 12-gauge stainless steel, with cellular neoprene gasket and a three position door stop rod. Door shall be hinged with a continuous 14-gauge stainless steel hinge secured with 1/4-20 stainless steel carriage bolts. Provide 3-point latching system with 3/4-inch diameter stainless steel padlocking handle. Also provide a Corbin No.2 deadbolt lock with 2 keys.

Enclosure shall have a 0.125-inch thick 5052-H32 aluminum mounting panel at back (interior) of enclosure.

Provide plastic print pocket attached to inside of door.

All abandoned cables shall be removed from the lighting control cabinet.

b. MAIN DISCONNECT

Fusible 200A, 2-pole, 600VAC, NEMA 4X stainless steel, heavy duty with insulated groundable neutral assembly, service ground kit and lockable in ON & OFF positions. Mount directly to back of enclosure as appropriate. Provide Bussmann 200A, 600V FRS-R Class RK5 fuses.

c. CONTACTORS

Contactors shall be 200A, 2-pole, mechanically held, 120V coil, Square-D #8903-SVO10-V02, and shall be mounted directly to back panel. The Contractor shall construct a separate latching/unlatching circuit using an 8-pin DPDT relay and socket (120Vcoil, 10A contacts) Square-D or Engineer approved equal.

d. CONTROL TRANSFORMER

Shall be 240VAC Primary, 120VAC Secondary, 1PH, 3KVA, Square-D #3S1F. The Contractor shall furnish Square-D #9080FB1211R fuse block assembly with 15A fuse to protect the line side of the transformer.

e. TIME CLOCK

The time clock shall be astronomical with non-volatile EEPROM memory, battery backup, -40°F to 155°F operating range, LCD display, daylight saving time and leap year correction. The Contractor shall provide an Intermatic #ET8215C.

f. SECONDARY LOAD CENTER

The Contractor shall provide circuit breaker enclosure for secondary circuits, Square-D #QO24L70S with one 20A breaker (#QO120) for maintenance circuit, one 15A breaker (#QO115) for photocell circuit, and one #PK0GTA2 Ground Bar.

g. PHOTOCELL

The photocell shall be of the button type and installed in the overhang of the control cabinet facing north. The Contractor shall apply silicon caulk to maintain the integrity of the enclosure. The photocell shall be rated for 120V, 1800W with 30-60 second delay between "ON-OFF" operations and be warranted for 5-years by the manufacturer. Photocell shall be Intermatic #K4021C or Engineer approved equal.

h. HAND-OFF-AUTO SWITCH

Switch shall be Square-D #9001-KS43B switch body, #9001-KA1 contact block and #9001-KN760WP nameplate mounted in Hoffman #E-1PB one hole box.

i. OTHER DEVICES

Furnish one 120V GFI duplex service receptacle in the surface mounted box and one 120V LED light fixture. The light fixture shall be surface mounted type with gasketed vapor tight globe, wire guard, lamp, and separate on/off switch in surface mounted box.

j. DUPLEX GFCI RECEPTACLE – Shall be Hubbell #GFR20ILA (20A)

k. 4" SQ DEEP BOX – Shall be Appleton #4SDEK with #8362 Cover

l. VAPOR TIGHT FIXTURE – Shall be E-conolight #E-VT1L141NG

m. 4" OCT. BOX – Shall be Appleton #4SDEK with #8362 cover

n. LAMP – Shall be GE 60W/A19

- o. LIGHT SWITCH – Shall be Hubbell #CS1221I (20A)
- p. 4" SQ DEEP BOX – Shall be Appleton #4SDEK with #8361 Cover
- q. NEUTRAL AND GROUND BAR – 240V CIRCUITS

Shall be 1/4"x4"x12" Copper Bus Bar with mounting hardware. The Contractor shall provide Burndy #KA4C (#14-#4 AWG) or #KA25 (#4-#1/0 AWG) copper mechanical lugs for all conductors to the bus bar, or Engineer approved equal. Appropriate sizes and quantities shall be determined from the plans and details, and space shall be left for future lugs on the bar. Insulated standoffs shall be provided for the neutral bar. A separate copper grounding bar shall be mounted within the cabinet, identical to the Neutral Bar, for terminating field equipment grounding conductors.

r. PANELBOARD

Panelboard shall include 240/480 volt, 400A Square 'D' panel, 200A main circuit breaker, and 40A branch circuit breakers and ground bar as follows:

- i. Panelboard: (1) – Square-D 400A, 600V, I-Line, #HKA-225-S4
- ii. Ground Bar: (1) – Square-D #PK0GTA2
- iii. Main Breaker: (1) – Square-D 2-Pole, 200A, 600V, I-Line, #JGA26200AB
- iv. Circuit Breakers: (12) – Square-D I-Line one pole, 40A, #FA-14040

Fillers (Square-D #HNM1BL or #HNM4BL) shall be provided as required.

s. METER PEDESTAL

A new meter pedestal ('Milbank' or Engineer approved equal) shall be furnished and installed under this item. The Contractor shall arrange for and pay all permits and fees associated with installation of the meter pedestal as incidental to the cabinet work unless a separate bid item is noted.

The Contractor shall furnish and install an Engineer approved meter pedestal, conduit fittings (10,000 AIC or as required by the

local utility), ground rod(s) and connection(s), and all necessary conductors and equipment required by the State Electrical Code and the utility for a service connection. Meter shall be located on the side of the cabinet as appropriate.

t. CONCRETE BASE

The concrete base shall be as shown on the plans and shall comply with the requirements of Section 654 of the WDOT Standard Specifications. Conduit shall be Schedule 80 PVC electrical conduit and shall conform to the requirements of Section 652 of the State Specs.

Anchor rods, nuts, and washers shall conform to the requirements of ASTM A449 or A687 (Grade 105). The entire length of the anchor rods, and the nuts and washers thereof, shall be hot-dip zinc coated in accordance with AASHTO M232.

Concrete Masonry shall conform to the requirements of Concrete Masonry, Grade A, AFA, A-S, A-IS or A-IP, Section 501 of the State Specs.

u. CONSTRUCTION

The cables shall be trained in straight horizontal and vertical directions and be parallel next to and adjacent to other cables whenever possible, using cable clamps attached with #10 screw to mounting panel, Panduit CCH series or Engineer approved equal. Adhesive type clamps are not allowed. All equipment shall be mounted to the panel in the enclosure unless otherwise indicated on the plans or directed by the Engineer. Refer to the plans and details for equipment layout within the cabinet. The cabinet interior shall be cleaned of all construction debris prior to final acceptance.

v. PROGRAM TIME CLOCKS AS FOLLOWS

Lights: turn on 20 minutes after sunset and off 20 minutes before sunrise.

Receptacles: turn on 1 hour prior to sunset and turnoff at midnight. Verify with City or Engineer prior to programming

8. TEMPORARY LIGHTING (WHERE APPLICABLE)

Temporary lighting shall be installed where called out on the plans. If no plans for temporary lighting are provided, the Contractor may still choose – at their own expense – to install Engineer approved temporary lighting (see Section 670.1 A. 1. b. above for additional information).

Regardless of whether temporary lighting is on the plans or the Contractor elects to install it, they shall be responsible for determining and providing any and all materials, labor, equipment, and miscellaneous supplies as needed to maintain lighting during construction, as incidental to the temporary lighting. All temporary lighting shall require submittals (and if applicable, plan drawings) approved by the Engineer. Maintenance of temporary lighting shall be incidental to the work.

a. MATERIALS

i. WOOD POLES

All temporary poles shall be wood unless otherwise approved in writing by the Engineer. Wooden poles shall be Class V or larger with a 35 ft. overall length, but this length shall be adjusted as needed to accommodate locations below existing utility poles and/or lines, and adjustments shall be incidental to the poles. The poles shall be northern pine in accordance with ANSI Standard 05.1 for Specifications and Dimensions of Wood Poles. All poles shall be pressure treated with 5% pentachlorophenol with a minimum of 8 pounds per cubic foot net retention of the oil-borne preservative. Provide 4 AWG copper wiring in accordance with Section 655 for pole wiring. The depth of the wood pole in the ground shall not be less than 5 feet or as directed by the engineer.

ii. DOWN GUYS

All down guys shall be galvanized, 3/8-inch nominal diameter, 7 strand, zinc coated steel wire conforming to ASTM A475, with 11,500 lbs. minimum breaking strength, and utilities grade or better. All guys shall have a 7-foot PVC or plastic guy guards. All guys shall have a guy strain insulator in accordance with ANSI Class 54-2, a tensile strength of 12,000 lbs., and a maximum cable diameter of 1/2-inch.



Anchor rods shall be twin-eye 5/8-inch nominal diameter with a minimum breaking strength of 11,500 lbs. Anchors shall be expanding or plate type with an expanded area of 125 square inches or greater. A screw type anchor may be used provided the anchor is at least 10-inches in diameter, has 78 square inches of an area, and an anchor rod diameter 1-1/4-inch by 66-inches or larger, and galvanized.

Guy wire clamps shall be 3-bolt and have a minimum breaking strength of 11,500 lbs. A galvanized service sleeve shall be used to hold down the loose guy ends beyond the guy clamp.

The dead ends shall be made of the same material as the guy wire.

iii. LUMINAIRES AND ARMS

Fixtures shall be high pressure sodium or LED cutoff luminaires of appropriate output, and mast arms shall be of appropriate length.

iv. AERIAL CABLE

The aerial cable shall consist of #2 AWG triplex or quadplex assembly of two or three XLP insulated power aluminum conductors, respectively, with an ACSR bare messenger wire (may be used as ground conductor if needed).

b. CONSTRUCTION

i. POLES

The depth of pole in the ground shall be no less than 5-feet, or as directed by the Engineer. All poles which are at the end of an aerial cable run, or where aerial cable tension could cause the pole to lean, shall have down guys installed. Any backfill in the hole around the buried section of pole shall be either stone chips, slurry, or other non-compressible material approved by the Engineer. Backfill shall be incidental to the pole.

ii. CABLE

The Contractor shall install the overhead lines in a manner which is safe and in accordance with all applicable codes, and shall correct excessive sag or loose connections until removal of the temporary system is acceptable to the Engineer, or until the final payment of the contract.

Cable shall be a minimum of 20-feet above any roadway or driving surface, and minimum 15-feet above all other surfaces.

Where necessary to connect to existing underground circuiting, the Contractor shall provide an appropriately sized, temporary junction box at the base of the wood pole for an above-ground splice. The cable that extends above grade shall be appropriately protected by a plastic cable guard or conduit for a minimum of 10 vertical feet.

iii. **REMOVALS**

Temporary lighting shall only be removed when the proposed permanent system is fully tested and functional, or with the express written permission of the Engineer. Once criteria for removals are met, all materials shall be removed as soon as practicable, and any voids or holes left by the temporary system shall be backfilled in compliance with Section 670.1 C. of the City Specs below.

iv. **FAILURES, DAMAGE, AND MALFUNCTIONS**

All temporary lighting shall be maintained in accordance with Section 670.1 A. 1 of the City Specs, as incidental to the contract, from the time of installation through the time of disconnection at the start of removals.

In the event of circuit failures in and near the project area during construction suspected to relate to construction activities, the Contractor, at his expense, shall respond to and troubleshoot outages. Whether or not the problem or solution lies within the project limits, he shall immediately make the necessary repairs per City specifications. The Contractor shall lay out his own work and shall be responsible for determining exact locations for equipment

and rough-ins and the exact routing of conduits so as to best fit the layout of his work.

Since damaged cable may not be discovered until non-working hours, the Contractor shall maintain a telephone number by which he can be contacted for said repairs 24 hours/day, 7 days/week, including holidays and weekends. Repairs must be permanent in nature and may include installation of an entire conduit crossing with pull boxes, trenching, cable replacement and other work needed as determined by the City Electrician.

Contractor shall be responsible for making repairs to street lighting and traffic signal systems which are believed to have been damaged as a result of the contractor's construction operations. After the Contractor has made sufficient repairs, should the Contractor demonstrate, to the satisfaction of the Engineer, that damage to the underground cable was obviously not a result of construction operations under this contract, and such cables were directed to be repaired by the Engineer, the Contractor shall be reimbursed by the City for actual costs of labor, equipment and material used on a cost-plus-limited basis per the terms of the contract.

The Contractor shall also be responsible for repairs for failure to the street lighting cable within the one-year warranty period following contract acceptance which are shown to be a result of the Contractor's construction activities. If the Contractor fails to abide by the requirements herein, the City reserves the right to complete the work independently of the Contractor and deduct the cost thereof from monies due the Contractor under this contract.

The Contractor or his representative shall respond to all emergency calls from the City of Wauwatosa within one (1) hour after notification and provide immediate corrective action. When equipment has been damaged or becomes faulty beyond repair, the contractor shall replace it with new and identical working equipment within one (1) working day. The cost of furnishing and installing the replaced equipment shall be borne by the contractor at no additional expense. The contractor may institute actions to recover damages from a responsible third party. If at any time, the contractor fails to perform all work as specified herein to keep the

temporary lighting system in proper operating condition; and if the contractor's designated personnel cannot be contacted, the City shall have the normal maintaining authority to perform the required repair. The cost of the repair shall be paid by the contractor.

## C. REMOVAL OF EXISTING LIGHTING

Holes left by all removals shall be backfilled with an Engineer approved material. This work shall be incidental to removals.

Where indicated on the plans or as directed by the Engineer, the Contractor may be required to salvage and deliver selected existing light poles, arms, luminaires, pull boxes, frames/covers, signs, or other materials – to be determined on a contract-by-contract basis – to the City of Wauwatosa Public Works Yard at 11100 W. Walnut Rd., Wauwatosa, WI 53226. Contact Randy Michelz, Traffic and Electrical Supervisor, (414) 471-8429

### 1. LIGHTING UNITS

Where indicated on the plans, lighting units shall be completely removed including pole (direct-bury or base mounted), base (as applicable), mast arm, luminaire, pole wiring, and all appurtenances, and the existing underground cables and conduits/ducts shall be cut off and safely abandoned below ground or temporarily spliced as required to maintain operation of the street lighting, all incidental to the removal unless otherwise noted as a separate base bid item. Except where noted on the plans, all of the above materials shall be disposed of offsite by the Contractor as incidental to all removals. The Contractor shall notify the Wauwatosa Electrical Supervisor 48 hours prior to the removal of the lighting units.

Any partial removal of lighting units shall only be as specifically indicated on the plans, or as directed by the Engineer.

### 2. CABLE, DUCT, AND CONDUIT

Where new underground conduit or duct is to be installed, the Contractor shall remove existing underground conduits/ducts (note conduits and ducts only need to be removed where exposed after abandonment; no filling or pulling of abandoned runs required) and their wiring, and dispose of/recycle offsite in an appropriate manner, as incidental to removals and proposed installations. All unused or

abandoned wires shall be removed from light poles, junction boxes, ducts, conduits, and the lighting control cabinet. Incidental splices shall be made where needed to maintain continuous operation of the lighting system.

### 3. SIGNS ON POLES

Signs attached to the existing poles shall be removed by the Contractor. The signs shall be placed on temporary posts, salvaged, or disposed of offsite as directed by the Engineer or shown on the plans. The Contractor shall reinstall the signs, or install new signs if so called for on the plans, on the nearest available new lighting unit or as indicated on the plans. Removing, temporarily posting, disposing of (where applicable), and reinstalling existing signs or installing new ones shall be considered incidental to the work unless otherwise noted as a separate base bid item. It may be noted on the plans the City of Wauwatosa is furnishing some signs.

### 4. PULL BOXES

Where indicated on the plans, existing pull boxes, frames, hardware, and covers shall be completely removed. The existing pull box frames, covers, hardware, and all other materials therein shall be disposed of off-site by the Contractor as incidental to removals. The existing underground cables and conduits/ducts in the pull box shall be cut off and safely abandoned below ground or temporarily spliced as required to maintain operation of the street lighting, incidental to the removal.

### 5. CABINETS

Cabinets shall be removed where indicated on the plans. Cabinets shall have all conductors and electric services disconnected in a safe manner. Unless otherwise indicated on the plans, removal shall include as incidental to the work the entire cabinet, the entire base including conduits, ducts, and cable, all internal and external electrical components, wiring, and hardware, meter pedestal (where applicable; unless otherwise indicated as a separate bid item), and any other interior or exterior attachments and their materials. The Contractor shall coordinate cabinet removals with WE Energies, the Engineer, and the City of Wauwatosa Electrical Supervisor as incidental to the removal.

## D. INSTALLATION

## 1. HDPE DUCT

Duct shall be installed 6"-12" from the back of curb, at a depth of 24"-30" of cover from the top of curb. The Contractor shall lay or bore the duct empty, i.e. without any proposed cable inside.

In the roadway (not driveways or walks), duct shall be installed in a 3" PVC Schedule 40 conduit sleeve at a depth of 18"-24" of cover for the sleeve from the top of pavement unless otherwise noted in the plans, but the sleeves shall be installed empty before the duct is pulled through. Duct shall NOT be placed in any sleeves before the sleeves are installed. PVC crossings shall extend 6"-12" beyond the back of curb. Compacted gravel (or spoils in turf areas) may be used for bedding and backfill material but it must be free from all rocks, pebbles, broken concrete, clay chunks or other material that may cause damage to the duct (or conduit). Backfill in these areas shall be thoroughly compacted to prevent future settlement. In paved (or brick paver) areas, the backfill for trenches shall be slurry where directed by the Engineer. Mason sand bedding is only required around direct-buried cable.

Should two or more crossings be required at a location, each crossing shall have its own HDPE duct in its own PVC sleeve, and the crossings shall be laid side-by-side at the same depth. Separate borings and trenches are not required.

The location of each crossing through a roadway shall be marked by arrowhead chisel marks or stamps in the curb edge at the top of curb. If curb at the crossings is to be replaced as part of this contract or from damage, then these marks shall be made in the proposed curb after it is installed.

### a. SLC TRANSITION/SHUR-LOCK II BENDS

Where indicated on the plans or as directed by the Engineer, Duraline Shur-Lock II couplers shall be used with Schedule 40 PVC conduit bends, of the size to match the HDPE conduit, to accomplish 90° turns in duct alignments. Couplers shall be sized as appropriate. Where used, Shur-Lock II fittings shall be noted on the as-built drawings and the Contractor shall verify to the Engineer the installation of the SLC transition is complete prior to backfilling. Transitions shall not be paid for unless confirmation of their installation has been made by the Engineer, or proof of their installation is provided to the Engineer, AND they are clearly shown on the as-built drawings. If the Contractor fills their excavation without notifying the Engineer or before the Engineer is able to

confirm installation, the Contractor shall, at their own expense, re-excavate and re-fill around the SLC for the Engineer's verification.

## 2. PVC CONDUIT

Unless otherwise noted on the plans, PVC conduit shall only be used as a sleeve for HDPE duct. Boring is only required where indicated on the plans. Boring in areas where it is not shown or directed by the Engineer shall NOT require any additional payment to the Contractor, unless the Engineer agrees in writing to extra costs before the work is performed.

Where the earth trench meets conduit that is either above or below the trench line, the trench line shall be sloped at a grade of not more than two inches (2") per foot to the conduit. The conduit is not to be bent up to meet the trench line. Where trench is excavated around the conduit end; any fill material placed beneath such conduit shall be properly compacted.

The material excavated from the trench shall be stored in such a manner as to do no damage to the adjacent public or private property. All surplus material shall be removed at the Contractor's expense and on the same day as it is excavated unless otherwise permitted in writing by the Engineer. The Contractor shall be strictly responsible for any damage done to adjacent public or private property arising from the excavation of the cable trench, laying the cables, or backfilling the trench. During the period trenches are left open, they shall be either covered or barricaded to the satisfaction of the Engineer.

Conduit sleeves shall be installed at any location where cable needs to cross under a roadway pavement (sleeves at driveways, walks, and trees are not required). These sleeves shall be installed perpendicular to the centerline of the road, at a depth of 18"-24" of cover from the top of pavement. The ends of these sleeves shall extend 6"-12" behind the back of curb. Compacted gravel (or spoils in turf areas) may be used for bedding and backfill material but it must be free from all rocks, pebbles, broken concrete, clay chunks or other material that may cause damage to the duct (or conduit). Backfill in these areas shall be thoroughly compacted to prevent future settlement. In paved (or brick paver) areas, the backfill for trenches shall be slurry where directed by the Engineer. Mason sand bedding is only required around direct-buried cable.

### a. BASES

Sleeves shall be placed in all bases (including, but not limited to, for light poles and cabinets), with PVC bends oriented to

accommodate future pulling of duct and cable, and of the size and quantity as indicated on the plans.

For light pole bases, factory made PVC elbows shall be cast in the base as sleeves for the cable-in-duct, incidental to the base. Location and size shall be as shown on the plans or directed by the Engineer. Elbows shall be installed in an orientation as to permit conduit to be installed in as nearly a straight-line run as possible, without bends. It is acceptable to the Engineer if the Contractor achieves this by "crisscrossing" the vertical portions of the elbows in the base, and/or orienting the elbows so the tops protrude from the top of the base and are cut down later, in order to create a more gradual curve inside the concrete. The sleeve opening in the side of the base shall be no less than 18" below the concrete top of the base.

### 3. CABLE

All new cable shall be installed in HDPE duct. Cable shall NOT be installed before the duct is placed in the ground or bases. The Contractor shall exercise care in the installation of the cable-in-duct to insure that the completed raceway is smooth and free of kinks and sharp bends. The Contractor shall verify that the conductors are free to move in the duct after installation. At the request of the Engineer, the Contractor shall demonstrate free movement of the conductors within the duct after installation and that the conductors can be easily removed and replaced.

Frost loops of at least 12 inches shall be provided where cables enter conduit systems. At any location where existing direct-buried cable is exposed, mason sand shall be used as a bedding material around the cable before backfilling.

Conductors in poles, pull boxes, or other terminations shall be marked with blue tape wrap to identify the set of conductors emanating from the distribution center (feeder). Neutral conductors shall be identified with white tape wrap, and grounding conductors shall be identified with green tape wrap.

### 4. PULL BOXES

Ground rods (5/8" x 8') shall be installed in all pull boxes where new construction meets the existing lighting system, and where indicated on the plans. Ground rods shall be paid per the bid item in the plans; if no such bid item exists, ground rods shall be incidental to the contract.



The new pull boxes shall be installed flush with grade, on 12 inches of crushed stone base, or as shown on the plan details, if applicable. Where the pull box joins new and existing cable, sections of existing electrical cables shall be routed through the new box and placed so as to be slack and readily accessible. In locations where new concrete is to be placed around the new box, the seam between the cover and the rim of the box and the bolt holes in the cover shall be taped to prevent accidental introduction of concrete into the seam or bolt holes.

The Contractor shall make every effort to prevent any damage to the existing electrical cables during the removal and installation process. Damage to cables incurred during the removal or installation process shall be repaired by the Contractor at the Contractor's expense.

The pull boxes shall be set flush with the grade or pavement and installed on aggregate per plan details.

All junction box covers are to be bolted down.

## 5. POLES

Each light pole shall be identified with 5-character, self-adhesive street light numbers. This identification shall consist of 2.5-inch tall black letters (2-inch on residential streets), numbers on a white background, die cut from engineer grade reflectorized sheeting. The identification number shall be assembled as a vertical label applied to the streetlight poles on the quadrant of the surface on the pole that faces oncoming traffic. The top of the label shall be installed at 5 feet above the ground line. Verify pole numbers with Engineer prior to installation of identification labels.

Poles on residential streets and decorative style poles shall NOT have number labels installed on the outside of the pole unless specifically called for on the plans.

Furnish and install all incidental items, such as hardware, transformer, pole wiring/fusing, grommets, etc. necessary to make the unit complete.

Furnish only items (Pole assembly and transformer) are to be delivered (in appropriate packaging/protective materials) to the City of Wauwatosa Public Works Yard at 11100 W. Walnut Road, Wauwatosa, WI 53226. Contact Randy Michelz, Traffic and Electrical Supervisor, 414-471-8429.

### a. POLE CONNECTIONS

In circuits with two feeds, red cable shall be used for even numbered poles, and black cable shall be used for odd numbered poles. Contractor shall verify the circuit is appropriately balanced amongst all appurtenances it powers.

## 6. LUMINAIRES/FIXTURES

Luminaires and their respective arms (where applicable) shall be installed in accordance with Sections 657 and 659 of the State Specs and the manufacturer's requirements.

## E. SPLICING REQUIREMENTS

Insulated cables shall be installed in continuous lengths without splices from terminal to terminal. Splicing will be permitted only in hand holes of poles, transformer bases, junction boxes or as otherwise provided on the plans. All splices other than underground cast-in-place splices shall be readily accessible.

Existing direct-buried cable may be spliced into new poles, cabinets, and pull boxes, but new cable-in-duct shall not.

### 1. LIGHTING UNITS

Splices in poles shall be made with reusable set-screw type connectors. Penn Union SX-2 or equal, copper service entrance connector, or Engineer approved equal. Complete splice with layer of nonstick varnished cambric insulating tape, followed by multiples laps of Scotch 130C rubber insulating tape, followed by multiple laps of Scotch Super 88 vinyl insulating tape. Split bolt compression connectors are not acceptable for this contract. Splice blocks will not be accepted.

Splices in poles shall be incidental to the pole bid item.

### 2. UNDERGROUND/PULL BOXES

Splices shall accept quantity and size of conductors required at individual pull boxes (which may be of differing configurations), be direct burial and submersible rated. Utilize multi-cable compression connectors with the splice encased in a Scotchcast 85 series multi-mold permanent resin compound. Split bolts are not allowed. No splices are allowed in pull boxes, unless indicated on the plans or otherwise approved by the Engineer.

Splices underground are only for extension of direct buried cables or repairs as approved by the City.

### 3. BOLLARDS

Utilize silicon-filled wire connectors of proper size equal to King Dryconn waterproof connectors.

## F. WARRANTY

The electrical contractor shall provide a written labor warranty for a minimum of 1 year after final acceptance of project installation. Warranty shall include materials damaged by Contractor's installation, otherwise materials shall be warranted by manufacturer. The Contractor shall be responsible during warranty period to coordinate replacement materials under warranty.

## G. SUBMITTAL REQUIREMENTS

The Contractor shall furnish a complete list and cut sheets/shop drawings of materials to be furnished and used for lighting and electrical. Such list shall include the names and addresses of manufacturers, together with catalog numbers, certificates of compliance, specifications, and other product information requested by the Engineer. Catalog numbers shall be identified on respective data sheet. The list and cut sheets/shop drawings shall be submitted within 21 calendar days of the award of the contract. No materials shall be incorporated into the lighting system prior to the written approval of the Engineer. Approval does not change the intent of the specifications. The Contractor shall not substitute or make changes in material without resubmittal for approval.

The following list is a general list of items shall be submitted for approval and shall not be considered an exhaustive list of items to be submitted:

- Lighting Control Cabinet (materials and equipment layout/wiring diagrams)
- Fuse Holders/Fuses
- Splices
- Duct
- Conduit (including connectors)
- Electrical Wire (underground and pole wiring)
- Wire Identification
- Pull Boxes
- Poles
- LED Luminaires

- LED Bollards (if applicable)
- Temporary Lighting Plan and Materials (if applicable)
- As-built Drawings (Prior to final payment).

The Contractor is allowed 1 submittal of each item for approval. If more submittals are required, the Contractor will be charged \$250 per item (e.g. duct, electrical wire) for additional review time with payment made with re-submittal, to be deducted from monies owed to the Contractor.

## 1. SUBSTITUTIONS

Any request for substitutions will only be reviewed by the City and Engineer after the award of the contract following the bid opening. Materials, equipment or methods of installation other than those named, will be considered only if such articles are in accordance with the general requirements and are similar in composition, dimension, construction, capacity, aesthetics, finish and performance.

In any case where the Contractor wishes to use equipment or methods other than those listed by name, such equipment shall be considered a substitution and must be approved by the City and Engineer. To gain approval for substitutions, the Contractor shall submit the following to the City and Engineer for review.

Documentation from the equipment manufacturer indicating where this equipment meets and does not meet the specifications or drawings as written. This documentation shall state all exceptions taken to the specification and the reasons for such exceptions. All documentation relative to the request for substitution shall be submitted on the manufacturer's letterhead and signed by a representative of the manufacturer. Equipment and materials submitted for review without proper documentation will be rejected without review.

- a. MANUFACTURER'S CUT SHEETS: Cut sheets shall be originals as are contained in the manufacturer's catalog. Photocopies of these sheets will not be accepted for review.
- b. LUMINAIRES: Request for substitutions shall include photometric test reports performed by an independent testing laboratory, as well as a summary of energy loading. Calculations indicating lighting levels and uniformities based on plan layout shall be included in the request. Photometric calculations for specified luminaire and submitted substitution shall be submitted for review. Substitutions shall meet or exceed photometric and energy use of specified luminaires. No substitution request will be considered if calculations are not submitted. Any luminaires on project that have specified same manufacturer/luminaire family elsewhere will require

acceptable substitution requests for ALL related luminaires from an equivalent manufacturer/luminaire family - no exceptions.

The Contractor shall provide samples of the proposed equipment for the Engineer's review, if requested by the latter, and any other information or materials as requested by the Engineer to establish equality.

The Contractor shall acknowledge that they have reviewed the submission criteria for the request for substitution by stamping the submission with a review stamp or acknowledgment by an accompanying letter.

Review fees are \$250 per each bid item substitution request, to be deducted from monies owed to the Contractor.

#### H. CIRCUIT IDENTIFICATION REQUIREMENTS

Color coding shall be accomplished by use of cable jackets of the proper color. All tails of all splices shall be coded. Secondary distribution circuits shall be color-coded with even circuits red, odd circuits black, neutral conductor white, and the ground conductor shall be green.

Each of the line-side underground conductors at every pole, bollard and pull box shall additionally have a 6" wrap of blue electrical tape applied to identify the set of conductors emanating "from" the control cabinet.

Each accessible location of underground cable in control cabinets, pull boxes, and pole/transformer bases shall have a permanent embossed 304 stainless steel tag with 3/16" characters (equal to Panduit #MEHT187 system) attached in a "flag" manner using a black outdoor rated nylon tie. The tag shall include information identifying the cabinet and conductor circuit number (i.e. L-3).

#### I. BRANCH CIRCUIT TAG OUT REQUIREMENTS

The Contractor may, at his option, work on live circuits or he may disconnect and tag out circuits. Any branch circuit not disconnected and tagged out shall be considered live, and the Contractor shall restrict his work force to those qualified to work on live circuits. Disconnection may be made by disconnecting branches at the overcurrent device.

Tag outs shall be made with manufactured electrical warning tags furnished by the Contractor and endorsed with the name of the Contractor, the date, and the project I.D. The Contractor shall clear all completed tag outs by the end of the workday.

## J. EQUIPMENT BONDING REQUIREMENTS

Bonding wire shall be installed in conduits for equipment grounding. All equipment shall be grounded as required.

## K. TESTING REQUIREMENTS

The Contractor shall perform acceptance tests for circuits installed under this project, and shall record that information on “Insulation and Equipment Testing Schedule” at the end of this Section 670 after construction is completed, as incidental to the contract. The Contractor shall create and provide all documentation to the City at completion of tests, with all system issues corrected at the Contractor’s expense and all tests passing.

All testing shall occur in the presence of the Engineer or the City Electrical Superintendent. The Contractor and the City shall agree on a time for testing of the completed installation with the required parties present.

The contractor shall create and provide all documentation to the City at completion of tests (with all system issues corrected).

The cost of testing shall be considered incidental to the installation of all electrical items and will not be paid for separately or as an extra/change order.

The lighting system is not complete until all electrical work is complete and inspected by the Engineer, and all electrical systems work properly.

A general system “Test Burn” shall be performed with any failed luminaires being replaced, along with any other non-functioning component(s) at the Contractor’s expense. Only one test burn for the purpose of identifying initial failures will be required. Insulation testing shall also be performed, as detailed below.

### 1. INSULATION TESTING/“MEGGER” TEST

On new underground conductors, fuses shall be removed from all fuse holders to not damage LED luminaire drivers during testing. Each conductor (entire length) shall have its insulation tested to ground from the control cabinet. The conductors shall have a reading of infinity at 1000Vdc impressed voltage to be accepted. If any readings do not meet the infinity requirement, the Contractor shall sequentially test each portion of the lighting circuit between termination points until the issue(s) can be identified. The issue(s) shall be mitigated by corrections or replacements including, but not limited to, tightening lugs, or replacing defective splices and conductors. Additional splices will NOT be allowed.

Testing instruments shall be accurate and reliable. It is strongly recommended that this testing be carried out after each span of cable is installed in a section of duct.

Light fixtures (LED and HPS) and existing conductors shall NOT be part of the insulation testing.

If equipment associated with the project does not operate properly or fails the tests as outlined, it is the Contractor's responsibility to determine issues and to correct and/or repair each defect at their own expense. If the Contractor does not test the new installation(s) prior to backfilling, paving, or any other surface restoration, they shall bear the expense of any excavations and/or removals required to complete repairs and testing

#### L. AS-BUILT INFORMATION

Upon completion of the project, the Contractor shall prepare an easily readable as-built plan and deliver one original copy to the Engineer. All changes from the original plan that were built into the project shall be noted in **red permanent ink** upon the original plans. As-built information shall be turned over along with testing results.

Any angled segments/shortcuts, bends, or any other locations where the new construction deviates from the specified plan locations, dimensions, alignments, or materials, shall be CLEARLY noted in the as-built so the City can provide accurate locating services in the future. As-built plans shall be submitted to the City within 3 weeks of the Engineer granting substantial completion of the project or for any portion of the project granted substantial completion.

#### M. ENERGY REBATES

The Contractor shall provide the Engineer with a copy of material invoice (pricing not necessary) for indicating proof of purchase, quantities, and complete manufacturer name/catalog number of luminaires provided on project. The City shall use this information to apply for any available rebates.

N. EXAMPLE TESTING REPORT TABLE

<b>INSULATION AND EQUIPMENT TESTING FOR</b> <b>PROJECT:</b> _____					<b>COMPANY:</b> _____ _____
EQUIPMENT OR CIRCUIT NAME:	TEST BY:	TEST RESULT: PASS OR FAIL	DATE TESTED:	OWNER OR ENGINEER PRESENT:	COMMENTS:



## SECTION 700 - CONTRACT

THIS contract made this \_\_\_\_\_ Day of \_\_\_\_\_, 20 \_\_\_\_ by and between \_\_\_\_\_

hereinafter called the "Contractor" and the City of Wauwatosa, Wisconsin, hereinafter called the "City".

WITNESSETH, that the Contractor and the City for the consideration stated herein, agree as follows:

ARTICLE I. SCOPE OF WORK The Contractor shall perform everything required to be performed and shall provide and furnish all labor, material and equipment for the work of \_\_\_\_\_

\_\_\_\_\_ all in strict accordance with the Plans and Specifications, including any or all addenda prepared by the City of Wauwatosa Engineering Services Division under the direction of the Director of Public Works, acting and in these contract documents referred to as the Director of Public Works, which plans and specifications are made a part of this contract in strict compliance with the Contractor's proposal and the other contract documents herein mentioned which are a part of this contract and the Contractor shall do everything required by this contract and the other contract documents constituting a part hereof.

ARTICLE II. THE CONTRACT PRICE In consideration of the completion of the work described herein and in fulfillment of all stipulations of this contract to the satisfaction and acceptance of the Director of Public Works and the City, the City shall pay and the Contractor further agrees to receive and accept payment based on the prices hereto attached, which prices shall agree with those in the accepted Contractor's proposal as filed with the City of Wauwatosa, Wisconsin on the \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_, as full compensation subject to the additions or deductions provided therein, in current funds.

ARTICLE III. COMPONENT PARTS OF THE CONTRACT This contract consists of the following component parts, all of which are as fully a part of this contract as if herein set out verbatim, if not attached as if hereto attached.

1. General Conditions (Section 500)
2. Advertisement for Bids (Section 100)
3. Instructions to Bidders (Section 200)
4. Contractor's Proposal (Section 300)
5. Wage Scale (Section 400)
6. Contract (Section 700)
7. Plans and Specifications (Section 600)
8. Bonds (Section 800)

In the event any provision in any of the above component parts of this contract conflicts with any provision in any other of the component parts, the provision in the component part first enumerated above shall govern over any component part which follows it numerically except as may otherwise be specifically stated.

IN WITNESS WHEREOF, the parties hereto have caused this instrument to be executed in four original counterparts the day and year first above written.

(SEAL)

\_\_\_\_\_  
Contractor

\_\_\_\_\_  
Address

Attest:

\_\_\_\_\_  
By \_\_\_\_\_

\_\_\_\_\_  
Title

\_\_\_\_\_  
Title

(SEAL)

*CITY OF WAUWATOSA*

Attest:

\_\_\_\_\_  
Owner

\_\_\_\_\_  
By \_\_\_\_\_

\_\_\_\_\_  
City Clerk

\_\_\_\_\_  
Mayor

\_\_\_\_\_  
City Clerk

Provision has been made to pay the liability that will accrue under this contract up to the original amount thereof as specified in the Common Council resolution authorizing the same. Liability in excess of the original amount of this contract may accrue only after additional endorsement hereon by the City Comptroller as to provision of funds therefor.

\_\_\_\_\_, 20 \_\_\_\_

\_\_\_\_\_  
City Comptroller

Approved as to form \_\_\_\_\_, 20 \_\_\_\_.

\_\_\_\_\_  
City Attorney

\*CORPORATE CERTIFICATE

I, \_\_\_\_\_ certify that I am the \_\_\_\_\_  
of the Corporation named as Contractor hereinabove; that \_\_\_\_\_  
\_\_\_\_\_, who signed the foregoing contract on behalf of the  
Contractor was then \_\_\_\_\_ of said Corporation; that  
said contract was duly signed for and in behalf of said Corporation by authority of its  
governing body, and is within the scope of its Corporate Powers.

\_\_\_\_\_  
Corporate Seal

\* If the Contractor is a corporation, the above Corporate Certificate should be executed.

If the contract is signed by the secretary of the Corporation, the above certificate should be executed by some other officer of the Corporation, under the corporate seal. In lieu of the foregoing certificate, there may be attached to the contract copies of so much of the records of the Corporation as will show the official character and authority of the officers signing, duly certified by the secretary or assistant secretary under the corporate seal to be true copies.

The full name and business address of the Contractor should be inserted and the contract should be signed with his official signature. Please have the names of the signing party or parties typewritten or printed under all signatures to the contract.

If the contractor should be operating as a partnership, each partner should sign the contract. If the contract is not signed by each partner, there should be attached to the contract a duly authenticated power of attorney evidencing the signer's (signers') authority to sign such contract for and in behalf of the partnership.

If the contractor is an individual, the trade name (if the contractor is operating under a trade name) should be indicated in the contract and the contract should be signed by such individual. If signed by one other than the contractor, there should be attached to the contract a duly authenticated power-of-attorney evidencing the signer's authority to execute such contract for and in behalf of the Contractor.

# CERTIFICATE OF INSURANCE

DATE (MM/DD/YYYY)

PRODUCER

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW.

## COMPANIES AFFORDING COVERAGE

COMPANY

**A**

COMPANY

**B**

COMPANY

**C**

COMPANY

**D**

INSURED

## COVERAGES

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED, NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATION MAY BE ISSUED OR MAY PERTAIN, THE ISSUANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YYYY)	POLICY EXPIRATION DATE (MM/DD/YYYY)	LIMITS	
	<b>GENERAL LIABILITY</b>				GENERAL AGGREGATE	\$
	<input type="checkbox"/> COMMERCIAL GENERAL LIABILITY				PRODUCTS-COMP/OP AGG	\$
	<input type="checkbox"/> CLAIMS MADE <input type="checkbox"/> OCCUR				PERSONAL & ADV INJURY	\$
	<input type="checkbox"/> OWNER'S & CONTRACTOR'S PROT				EACH OCCURRENCE	\$
					FIRE DAMAGE (Any one fire)	\$
					MED EXP (Any one person)	\$
	<b>AUTOMOBILE LIABILITY</b>				COMBINED SINGLE LIMIT	\$
	<input type="checkbox"/> ANY AUTO				BODILY INJURY (Per Person)	\$
	<input type="checkbox"/> ALL OWNED AUTOS				BODILY INJURY (Per Accident)	\$
	<input type="checkbox"/> SCHEDULED AUTOS				PROPERTY DAMAGE	\$
	<input type="checkbox"/> HIRED AUTOS					
	<input type="checkbox"/> NON-OWNED AUTOS					
	<b>GARAGE LIABILITY</b>				AUTO ONLY-EA ACCIDENT	\$
	<input type="checkbox"/> ANY AUTO				OTHER THAN AUTO ONLY:	
					EACH ACCIDENT	\$
					AGGREGATE	\$
	<b>EXCESS LIABILITY</b>				EACH OCCURRENCE	\$
	<input type="checkbox"/> UMBRELLA FORM				AGGREGATE	\$
	<input type="checkbox"/> OTHER THAN UMBRELLA FORM					\$
	<b>WORKERS' COMPENSATION AND EMPLOYERS' LIABILITY</b>				STATUTORY LIMITS	\$
	THE PROPRIETOR/ PARTNERS/EXECUTIVE OFFICERS ARE: <input type="checkbox"/> INCL <input type="checkbox"/> EXCL				EACH ACCIDENT	\$
					DISEASE-POLICY LIMIT	\$
					DISEASE-EACH EMPLOYEE	\$
	<b>OTHER</b>					\$
						\$
						\$

DESCRIPTION OF OPERATIONS/LOCATION/VEHICLES/SPECIAL ITEMS

## CERTIFICATE HOLDER

City of Wauwatosa  
7725 W. North Avenue  
Wauwatosa, WI 53213

## CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING COMPANY WILL MAIL 10 DAYS WRITTEN NOTICE TO THE CITY OF WAUWATOSA.

AUTHORIZED REPRESENTATIVE:

CERTIFICATION OF COMPLIANCE WITH UNEMPLOYMENT INSURANCE AND  
SOCIAL SECURITY ACT REQUIREMENTS

The Contractor hereby certifies that he has heretofore complied and will during the progress of the work, comply with the Wisconsin Unemployment Insurance Act and will hold the City harmless from any liability for benefits under such Act or Acts by reason of discontinuance by the Contractor of the employment of any person engaged by the Contractor upon the work. The Contractor also hereby certifies that he will during the progress of the work comply with the Federal Social Security Act and will hold the City harmless from any Social Security payments and provisions required by such Act respecting his or his subcontractors' employees.

\_\_\_\_\_  
Contractor Name

\_\_\_\_\_  
Contractor Signature

\_\_\_\_\_  
Date

Accepted by City:

\_\_\_\_\_  
City Attorney

\_\_\_\_\_  
Date

# DEBARMENT CERTIFICATION FORM

The Contractor certifies that, neither the Contractor firm nor any owner, partner, director, officer, or principal of the Contractor, nor any person in a position with management responsibility or responsibility for the administration of federal funds:

(a) Is presently debarred, suspended, proposed for debarment, and declared ineligible or voluntarily excluded from covered transactions by any federal or state department/agency;

(b) Has within a three-year period preceding this certification been convicted of or had a civil judgment rendered against it for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public transaction or contract (federal, state, or local); violation of federal or state antitrust statutes; or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Is presently indicted for or otherwise criminally or civilly charged by a governmental entity (federal, state, or local) with commission of any of the offenses enumerated in paragraph (b) above; or

(d) Has within a three-year period preceding this certification had one or more public transactions or contracts (federal, state, or local) terminated for cause or default.

If the contractor is "Actively" registered with SAMS (Service for Award Management), the following UEI (Unique Entity ID) number has been assigned: \_\_\_\_\_

The Contractor further certifies that it shall not knowingly enter into any transaction with any subcontractor, material supplier, or vendor who is debarred, suspended, declared ineligible, or voluntarily excluded from covered transactions by any federal or state department/agency.

Dated this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_\_

By \_\_\_\_\_  
Authorized Signature for Contractor

\_\_\_\_\_  
Printed Name and Title

Subscribed and sworn to before me this \_\_\_\_\_  
\_\_\_\_\_, 20 \_\_\_\_\_

\_\_\_\_\_  
(Notary Signature)

Notary Public, State of \_\_\_\_\_

My Commission expires: \_\_\_\_\_

**SECTION 800 - BONDS**  
**BID BOND**

KNOW ALL MEN BY THESE PRESENTS, THAT we \_\_\_\_\_

\_\_\_\_\_  
(hereinafter called the Principal) and \_\_\_\_\_

\_\_\_\_\_  
(hereinafter called the Surety), A corporation chartered and existing under the laws of the State of \_\_\_\_\_, with its principal offices in the City of \_\_\_\_\_, and authorized to do business in Wauwatosa, Wisconsin, in the full and just sum of \_\_\_\_\_ Dollars (\$\_\_\_\_\_) good and lawful money of the United States of America, to be paid upon demand of the CITY OF WAUWATOSA, WISCONSIN, to which payment, well and truly to be made, the Principal and the Surety bind themselves, their heirs, executors, administrators and assigns, jointly and severally and firmly by these presents.

WHEREAS, The Principal is about to submit, or has submitted to the City of Wauwatosa, Wisconsin, a proposal for furnishing all labor, materials, equipment and incidentals necessary to \_\_\_\_\_

\_\_\_\_\_ and;

WHEREAS, The Principal desires to file this bond in accordance with law, in lieu of a certified bidder's check otherwise required to accompany this proposal.

NOW, THEREFORE: The conditions of this obligation are such that if the Proposal is accepted, the Principal shall, within ten days after the date of receipt of a written notice of award of contract, execute a contract in accordance with the Proposal and upon the terms, conditions, and price(s) set forth therein, of the form and manner required by the City of Wauwatosa, Wisconsin and execute a sufficient and satisfactory contract performance bond payable to the City of Wauwatosa, Wisconsin, in an amount of One Hundred Percent (100%) of the total Contract price, in form and with security satisfactory to said City, then this obligation to be void; otherwise to be and remain in full force and virtue in law; and the Surety shall, upon failure of the Principal to comply with any or all of the foregoing requirements within the time specified above, immediately pay to the aforesaid City, upon demand, the amount hereof in good and lawful money of the United States of American, not as a penalty but as liquidated damages.

IN TESTIMONY THEREOF, the Principal and Surety have caused these presents to be duly signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_ 20 \_\_\_\_.

\_\_\_\_\_  
Principal

By \_\_\_\_\_  
(Seal)

\_\_\_\_\_  
Surety

\_\_\_\_\_  
(Seal)

Countersigned \_\_\_\_\_

Local Resident Producing Agent for \_\_\_\_\_

\_\_\_\_\_



(Note: This form of bond must be executed after the award of the contract.)

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS, That we, \_\_\_\_\_

\_\_\_\_\_ as Principal, and \_\_\_\_\_

as Surety, are held and firmly bound unto the City of Wauwatosa, 7725 W. North Avenue, Wauwatosa, Wisconsin 53213, hereinafter called the City, in the penal sum of \_\_\_\_\_

\_\_\_\_\_ Dollars, (\$ \_\_\_\_\_) lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

The condition of this Obligation is such, that whereas the principal has executed the attached Agreement dated \_\_\_\_\_

Now, Therefore, if the attached agreement is executed on behalf of the City and if the Principal shall well and truly perform and fulfill all the undertakings, covenants, terms and conditions of the said agreement, and any and all duly authorized modifications of the said agreement that may hereafter be made and shall pay to each and every person or party entitled thereto all the claims for work or labor performed or materials furnished, including premiums for Worker's Compensation Insurance, for or in or about or under such agreement as provided in Section 779.14 and 779.15 of the Wisconsin Statutes, and any such authorized extension or modification of said agreement, then this obligation to be void, otherwise to remain in full force and virtue.

And the said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the agreement or to work to be performed thereunder or the specifications accompanying the same shall in any wise affect its obligations on this bond, it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the agreement to the work or to the specifications.

IN WITNESS WHEREOF the above-bounden parties have executed this instrument, in \_\_\_\_\_ original counterparts, under their several seals this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

In presence of:

\_\_\_\_\_  
(Individual Principal) (SEAL)

\_\_\_\_\_  
(Business Address)

\_\_\_\_\_  
(SEAL)

\_\_\_\_\_  
(Business Address)

Attest:

\_\_\_\_\_  
(Corporate Principal)

\_\_\_\_\_  
(Business Address)

\_\_\_\_\_  
By \_\_\_\_\_ (Affix  
Corporate Seal)

Attest:

\_\_\_\_\_

\_\_\_\_\_  
(Corporate Surety)

\_\_\_\_\_  
(Business Address)

\_\_\_\_\_  
By \_\_\_\_\_ (Affix  
Corporate Seal)

\_\_\_\_\_

Approved \_\_\_\_\_, 20 \_\_\_\_.

\_\_\_\_\_  
\_\_\_\_\_  
Mayor  
(Title)

NOTE: The Bond must be approved and the approval dated in every case;  
refer to Section 779.14 and 779.15 Wisconsin Statutes. The title  
of the person signing must be indicated.

## LABOR & MATERIAL PAYMENT BOND

### KNOW ALL MEN BY THESE PRESENTS:

That \_\_\_\_\_  
(Here insert full name and address or legal title of Contractor)

as Principal, hereinafter called Principal, and \_\_\_\_\_  
(Here insert full name and address or legal title of surety)

as Surety, hereinafter called Surety, are held and firmly bound unto the City of Wauwatosa, 7725 West North Avenue, Wauwatosa, Wisconsin 53213, as Obligee, hereinafter called City for the use and benefit of claimants as hereinbelow defined, in the amount of \_\_\_\_\_ Dollars (\_\_\_\_\_), for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Principal has by written agreement dated \_\_\_\_\_, 20 \_\_, entered into a contract with City for \_\_\_\_\_

(Here insert full name, address and description of project)  
in accordance with Drawings and Specifications prepared by \_\_\_\_\_

(Here insert full name and address or legal title of Director of Public Works)  
which contract is by reference made a part hereof, and is hereinafter referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Principal shall promptly make payment to all claimants as hereinafter defined, for all labor, material used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect, subject, however, to the following conditions.

1. A claimant is defined as one having a direct contract with the Principal or with a Subcontractor of the Principal for labor, material, or both, used or reasonably required for use, in the performance of the Contract, labor and material being construed to include that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

2. The above name Principal and Surety hereby jointly and severally agree with the City that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant, may sue on this bond for the use of such claimant, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon. The City shall not be liable for the payment of any costs or expenses of any such suit.

3. No suit or action shall be commenced hereunder by any claimant:  
a) Unless claimant, other than one having a direct contract with the Principal, shall have given written notice to any two of the following: The Principal, the City, or the Surety above named, within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail, postage prepaid, in an envelope addressed to the Principal, City or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the State in which the aforesaid project is located, save that such service need not be made by a public officer.

b) After the expiration of one (1) year following the date on which Principal ceased work on said Contract or after the expiration of one (1) year following the date of Substantial Completion of the Project, whichever is later, it being understood, however, that if any limitation embodied in this bond is prohibited by any law controlling the construction hereof such limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

c) Other than in a state court of competent jurisdiction in and for the county or other political subdivision of the State in which the Project, or any part thereof, is situated, or in the United States District Court for the district in which the Project, or any part thereof, is situated, and not elsewhere.

4. The amount of this bond shall be reduced by and to the extent of any payment of payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens which may be filed of record against said improvement whether or not claim for the amount of such lien be presented under and against this bond.

Signed and sealed this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_.

	_____	_____
	(Principal)	(Seal)
_____	By _____	
(Witness)	(Title)	
	_____	_____
	(Surety)	(Seal)
_____	By _____	
(Witness)	(Attorney-in-Fact)	

AFFIDAVIT

(To be attached to all contracts)

STATE OF WISCONSIN)

)SS.

COUNTY )

\_\_\_\_\_ being first  
duly sworn on oath deposes and says he is \_\_\_\_\_

\_\_\_\_\_ (Attorney-in-fact or agent) of

\_\_\_\_\_ (Bonding Company)

surety on the attached contract number \_\_\_\_\_ executed by

\_\_\_\_\_ (Contractor).

Affiant further deposes and says that no officer, official or employee of the  
City of Wauwatosa has any interest directly or indirectly, or is receiving any  
premium, commission fee or other thing of value on account of the same or  
furnishing of the bond, undertaking or contract of indemnity, guaranty, or  
suretyship in connection with the above mentioned contract.

Signed \_\_\_\_\_

Subscribed and sworn to before me

This \_\_\_\_\_ day of \_\_\_\_\_, A.D.; 20 \_\_\_\_.

\_\_\_\_\_ (Notary Public)

\_\_\_\_\_ County, Wisconsin

My Commission expires \_\_\_\_\_.